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## Interpretations, analyses and suggestions on the pollution prevention measures in the Polar Code

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**WORLD MARITIME UNIVERSITY**

Dalian, China

**INTERPRETATIONS, ANALYSES, AND  
SUGGESTIONS ON THE  
POLLUTION PREVENTION MEASURES  
IN THE POLAR CODE**

By

**YAN HECHENG**

**The People's Republic of China**

A research paper submitted to the World Maritime University in partial fulfillment  
of the requirements for the award of the degree of

**MASTER OF SCIENCE**

**(MARITIME SAFETY AND ENVIRONMENTAL MANAGEMENT)**

**2017**

## DECLARATION

I certify that all the materials in this dissertation that are not my own work have been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this research thesis reflect my own personal views, and are not necessarily endorsed by the University.

(Signature): YAN HECHENG

(Date): 2017.06.29

**Supervised by: ZHANG SHUOHUI**

Professor

Dalian Maritime University

**Assessor:** \_\_\_\_\_

**Co-assessor:** \_\_\_\_\_

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## **ABSTRACT**

Title of Dissertation: **Interpretations, Analyses and Suggestions on  
the Pollution Prevention Measures in  
the Polar Code**

Degree: MSc

In recent years, global warming has become a consensus. The subsequent emergence of the ice melting makes more and more people pay attention to the polar shipping. In order to solve the problem of safety and environmental protection brought by polar shipping, relevant guidance documents have been introduced internationally. As the first mandatory Code, the Polar Code entered into force on January 1, 2017.

However, some environmental organizations and countries believe that its environmental provisions are too small and too weak, and it is not in accordance with the status of environmental protection in maritime conventions, and cannot effectively protect the environment.

Based on this, in order to solve this problem, this thesis focused on the explanation and analysis of the pollution prevention measures of the Polar Code, interpreted the formulation process of each regulation, and adopted the timeline analysis, fishbone analysis, comparative analysis and statistical analysis Method, and found out some existing problems. In the end, the author gave some suggestions on the formulation of provisions and the response of stakeholders in the future.

**KEY WORDS:** pollution prevention measures, Polar Code, formulation, stakeholders

## CONTENTS

<b>DECLARATION</b>	<b>II</b>
<b>ACKNOWLEDGEMENTS</b>	<b>III</b>
<b>ABSTRACT</b>	<b>IV</b>
<b>LIST OF TABLES</b>	<b>VIII</b>
<b>LIST OF FIGURES</b>	<b>IX</b>
<b>LIST OF ABBREVIATIONS</b>	<b>X</b>
<b>CHAPTER 1: INTRODUCTION</b>	<b>1</b>
1.1 It is time to study on the pollution prevention measures in the Polar Code	1
1.2 Objectives of research	2
1.3 Literature review and innovation points	3
1.4 Methodology	4
1.5 Structure of dissertation	6
<b>CHAPTER 2: INTRODUCTION OF THE POLAR CODE AND ITS POLLUTION PREVENTION REQUIREMENTS</b>	<b>7</b>
2.1 Polar Code	7
2.1.1 Introduction of the Polar Code	7
2.1.2 Basic structure of the Polar Code	7
2.2 The pollution prevention measures of the Polar Code	8
2.2.1 Introduction of pollution prevention measures	8
2.2.2 Basic structure of the pollution prevention measures	10
2.3 Chapter summary	11
<b>CHAPTER 3: INTERPRETATION AND ANALYSIS ON THE PREVENTION OF POLLUTION BY OIL</b>	<b>12</b>
3.1 Interpretation on specific provisions	13
3.1.1 Operation requirements	13
3.1.2 Structural requirements	17
3.1.3 Additional guidance	21
3.2 Analysis on prevention of pollution by oil	24
3.2.1 Risk sources analysis based on the Fishbone Diagram	24

3.2.2 Statistical analysis of the proposals	26
3.3 Chapter summary and suggestions	27
<b>CHAPTER 4: INTERPRETATION AND ANALYSIS ON THE CONTROL OF POLLUTION BY NOXIOUS LIQUID SUBSTANCES IN BULK</b>	<b>30</b>
4.1 Interpretation on specific provisions	30
4.1.1 Operational requirements	30
4.1.2 Additional guidance	33
4.2 Analysis on prevention of pollution by noxious liquid substances in bulk	34
4.2.1 Risk sources analysis based on Fishbone Diagram	34
4.2.2 Statistical analysis of the proposals	35
4.3 Chapter summary and suggestions	36
<b>CHAPTER 5: INTERPRETATION AND ANALYSIS ON PREVENTION OF POLLUTION BY SEWAGE FROM SHIPS</b>	<b>38</b>
5.1 Interpretation on specific provisions	38
5.1.1 Definitions	38
5.1.2 Operational requirements	39
5.2 Analysis on prevention of pollution by sewage from ships	42
5.2.1 Risk sources analysis based on Fishbone Diagram	42
5.2.2 Comparative analysis of the requirements for the discharge	43
5.2.3 Statistical analysis of the proposals	46
5.3 Chapter summary and suggestions	47
<b>CHAPTER 6: INTERPRETATION AND ANALYSIS ON PREVENTION OF POLLUTION BY GARBAGE FROM SHIPS</b>	<b>49</b>
6.1 Interpretation on specific provisions	49
6.1.1 Definitions and operational requirements	49
6.1.2 Additional guidance	53
6.2 Analysis on prevention of pollution by garbage from ships	53
6.2.1 Risk sources analysis based on Fishbone Diagram	53
6.2.2 Comparative analysis of the requirements for the discharge	54
6.2.3 Statistical analysis of the proposals	57
6.3 Chapter summary and suggestions	58
<b>CHAPTER 7: OVERALL ANALYSIS AND RECOMMENDATIONS</b>	<b>60</b>

7.1 Overall analysis of pollution prevention measures and recommendations for amendments to the Polar Code	60
7.1.1 Overall analysis of pollution prevention measures	60
7.1.2 Proposals for amendments to the provisions of the Polar Code	62
7.2 Overall statistical analysis of proposals and recommendations to stakeholders	64
7.2.1 Stastical analysis of the total number of proposals	64
7.2.2 Statistical analysis on the proposals of different stakeholders in different aspects	66
7.2.3 Recommendations to the Stakeholders	68
<b>CHAPTER 8: CONCLUSION</b>	<b>72</b>
<b>REFERENCES</b>	<b>75</b>
<b>APPENDIX A</b>	<b>82</b>
<b>ANNEX</b>	<b>87</b>
<b>APPENDIX B</b>	<b>89</b>



## LIST OF TABLES

Table 3.1	The formulation process of Regulation 1.1.1 and 1.1.2	13
Table 3.2	The formulation process of Regulation 1.1.3	15
Table 3.3	The formulation process of Regulation 1.1.4	16
Table 3.4	The formulation process of Regulation 1.2	18
Table 3.5	Structure requirements comparison for the polar waters with the general waters	20
Table 3.6	The formulation process of Additional guidance Regulation 1.1	22
Table 3.7	The formulation process of Additional guidance Regulation 1.2	24
Table 4.1	The formulation process of Regulation 2.1.1	30
Table 4.2	The formulation process of Regulation 2.1.2	31
Table 4.3	The formulation process of Regulation 2.1.3	32
Table 5.1	The formulation process of Regulation 4.2.1 and 4.2.2	40
Table 5.2	The formulation process of Regulation 4.2.3	41
Table 5.3	Comparison of sewage discharge requirements in the MARPOL Convention and the Polar Code	44
Table 6.1	The formulation process of Regulation 5.1.1-5.2.1.4	50
Table 6.2	The formulation process of Regulation 5.2.1.5	51
Table 6.3	Comparison of garbage discharge requirements in the MARPOL Convention and the Polar Code	55
Table 7.1	Summary of the mandatory pollution prevention measures in Polar Code	60
Table 7.2	Summary of the other aspects concerned by environmental organizations	62
Table 7.3	Summary of the suggested amendments to the Polar Code	63

## LIST OF FIGURES

Figure 2.1	Basic structure of the Polar Code	8
Figure 2.2	How the Polar Code protect the environment	10
Figure 2.3	Basic structure of the pollution prevention measures in Polar Code	11
Figure 3.1	Risk sources analysis of oil pollution based on the Fishbone Diagram	25
Figure 3.2	Timeline of relevant proposals on prevention of oil pollution	27
Figure 4.1	Risk sources analysis of pollution by noxious liquid substance in bulk based on the Fishbone Diagram	34
Figure 4.2	Timeline of relevant proposals on prevention of NLS pollution	36
Figure 5.1	Risk sources analysis of pollution by sewage from ships based on the Fishbone Diagram	42
Figure 5.2	Timeline of relevant proposals on prevention of sewage pollution	46
Figure 6.1	Risk sources analysis of pollution by garbage from ships based on the Fishbone Diagram	54
Figure 6.2	Timeline of relevant proposals on prevention of garbage pollution	58
Figure 7.1	The compared chart of total proposal quantity	65
Figure 7.2	The proposal quantity of different stakeholders in different aspects	67

## LIST OF ABBREVIATIONS

IPCC	Intergovernmental Panel on Climate Change
UNEP	United Nations Environment Programme
IMO	International Maritime Organization
SHMSA	Shanghai Maritime Safety Administration
MARPOL	International Convention for the Prevention of Pollution from Ships, 1973, as modified by the 1978 and 1997 Protocols
POLAR CODE	International Code for Ships Operating in Polar Waters
AMSA	Arctic Marine Shipping Assessment
AMAP	Arctic Monitoring and Assessment Programme
NLS	Noxious Liquid Substances in bulk
MEPC	Marine Environment Protection Committee
DE	Sub-Committee on Ship Design and Equipment
SDC	Sub-Committee on ship Design and Construction
ISWG PC	Intersessional Working Group on the Polar Code
DWT	Deadweight Tonnage
MLC2006	Maritime Labour Convention, 2006
STCW78/95	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995
HFO	Heavy Fuel Oil
FOEI	Friends of the Earth International
WWF	World Wildlife Fund
PE	Pacific Environment
IFAW	International Fund for Animal Welfare
GBS	Goal-based Standards
IBC	International Bulk Chemical Code
WMO	World Meteorological Organization

## CHAPTER 1

### INTRODUCTION

#### 1.1 It is time to study on the pollution prevention measures in the Polar Code

According to the United Nations Intergovernmental Panel on Climate Change (IPCC) published in 2014 "climate change report" (IPCC, 2014), the Arctic will be ice free in summer in the middle of twenty-first Century. As the Arctic melting, in view of the Arctic Channel can save the sailing time and transportation costs, avoid the pirates and other advantages, more ships will go through the arctic. The rich mineral resources and tourism development in the Arctic will also promote more ships to navigate in the Arctic waters. (UNEP, 2013)

The hazards of maritime transport in Polar waters, which include safety and environmental issues, are primarily “low temperatures alter the physical properties of many materials, and the overall environmental severely degrades human performance” (Anderson, 2012) In order to ensure the safety of navigation and protect the fragile Arctic marine environment, the International Maritime Organization (IMO) has dedicated to the development of specialized navigation standards for the arctic, such as the Polar Code (International Code for Ships Operating in Polar Waters). However, many scholars had expressed disappointment on the pollution prevention measures in the Polar Code. For example, Dave Walsh believed that Polar Code is too weak to protect polar environments. (Walsh, 2014) In addition, some scholars supposed that the Polar Code's adoption would do little to reduce risks to the Antarctic environment. (Haun, 2014)

Unlike other regions, the polar ecosystems are more fragile, poor and sensitive, once the marine pollution occurs, it will have more serious consequences. (Cao, 2011) The existence of sea ice leads to the decrease of the self-purification capacity of seawater, and the increase of human activities will leads to greater environmental pressure and threaten the polar ecological environment. (Mi, 2016) Therefore, the impact of polar navigation on the polar ecological environment cannot be ignored.

Based on this, this thesis will focuses on the pollution prevention measures in the Polar Code, through the interpretation and analysis to these measures and all the relevant proposals for specific measures, provides a reference to the development of these measures in the future.

## **1.2 Objectives of research**

Throughout the previous Conventions on the Protection of the Marine Environment, loose provisions are not conducive to the protection of the marine environment, but strict provisions are detrimental to the interests of the relevant countries, so most of the Conventions are the result of political consultations which based on technique. At present, the Polar Code just entered into force on 1 January 2017. As a mandatory Convention which is applicable to the entire polar areas, it is welcomed by all parties. However, some countries and organizations (especially environmental organizations) believe that its provisions on pollution prevention measures are too weak and few (about 15% of the whole Code) (Walsh, 2014; Haun, 2014), which is not commensurate with the importance of environmental protection in maritime conventions. In addition, some issues (such as heavy fuel oil) have not yet been effectively addressed.

Based on this, in order to promote the rational development of pollution prevention in polar waters, this thesis will mainly interpret and analyzes the pollution prevention measures in Polar Code, from the aspects of technology (specific measures) and politics (participation in proposals), and put forward the corresponding suggested amendments, forecasts and recommends some amendments to pollution prevention measures and provides a reference for the relevant stakeholders.

### **1.3 Literature review and innovation points**

With regard to prevent pollution from ships in the polar waters, the existing researches are mainly from the members of the Arctic Council, as well as some specialized research institutions and environmental organizations. For example, the Arctic Marine Shipping Assessment (AMSA) 2009 Report (Arctic Council, 2009), made by the Arctic Council, including almost all the aspects<sup>1</sup> about shipping in Arctic. Jarrod DeWitz, Dr. Aykut Ölçer, and Dr. Dimitrios Dalaklis introduced the benefits of alternative fuel in 2015.( DeWitz et al., 2015) In 2016, Sigurd Jacobsen described the measures to prevent oil pollution in the Arctic.( Jacobsen, et al., 2016) Aldo Chircop believed that a substantial shortcoming of the Polar Code is the narrow environmental scope, and provided many points that needs to be solved.( Chircop, 2016) A summary of Arctic pollution issues was issued by the Arctic Monitoring and Assessment Programme (AMAP) concerned different pollutants.(AMAP,2015) David Leary introduced basic parts of the Polar Code. (David Leary, 2015) Samrat Ghosh introduced all the risks of Arctic shipping, especially the pollution. ( Ghosh, 2015) David L. VanderZwaag gave some corresponding suggestions to prevent the pollution from ship in Arctic waters. ( VanderZwaag, 2012)

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<sup>1</sup> More information can be found in its website: <http://www.arctic-council.org/index.php/en/>

As can be seen from the above literatures, most of them focused on the importance of pollution prevention in polar waters, the feasibility (cost-benefit) and challenge of pollution prevention measures, and the discussion of new technologies. Few articles have discussed and analyzed the specific provisions of the pollution prevention measures and the relevant proposals in IMO meetings.

In fact, the analysis of these specific provisions and proposals can provide insight into the intention of the Code and effectively understand the concerns of the parties. Therefore, this thesis will focus on all the provisions of pollution prevention measures and all the proposals of the formulation process for analysis, and make recommendations, which will help the parties to implement, amend and response in the future.

## **1.4 Methodology**

On the whole, the research methods of this thesis are as follows:

### **.1 Timeline analyses**

The timeline analysis of this thesis mainly includes two aspects: specific provisions and different pollution sources. Through the statistics of the discussed contents of each meeting which formulated specific provisions of the Polar Code, the author will get the timelines of the formulation process of provisions, and then summarizes and interprets them, which will be contribute to the understanding and amendments to the specific provisions of the Polar Code. In addition, according to the different chapters of the pollution prevention measures, this thesis also sets out the timelines for different pollution sources, it will helps to understand and forecast the development of the whole pollution prevention measures.

## .2 Fishbone Diagram analyses

Fishbone diagrams are causal diagrams created by Kaoru Ishikawa (1968) that show the causes of a specific event. It break down (in successive layers of detail) root causes that potentially contribute to a particular effect. ([Wikipedia, 2017](#)) In this thesis, the author uses the Fishbone Diagrams in Chapter 3, 4, 5 and 6 to analyze the additional risk sources for each pollution source due to the particularity of the polar waters, so as to analyze the necessity and rationality of the current measures. And then, further measures and recommendations for additional measures are proposed in this thesis.

## .3 Comparative analyses

Comparative analysis can reveal the similarities and differences between different things, and help to find problems. This thesis uses many comparative analyses, such as the structural requirements in Regulation 3.1.2 for the prevention of oil pollution, the sewage pollution prevention measures in Regulation 3.4.3.2, the garbage pollution prevention measures in Regulation 3.5.4.2, respectively comparing with the MARPOL Convention. In addition, this thesis compares the pollutants which have the similar hazards to waters, such as the oil with NLS (Noxious Liquid Substances in bulk) pollution, the sewage with garbage pollution, etc. Through these contrasts, the author raises problems and suggestions.

## .4 statistical analyses

Statistical analyses can objectively reflect the laws of things through specific data. In the chapter 3 to 7, this thesis analyzes the number of proposals and the participated stakeholders, reflecting the different positions and concerns of different stakeholders.



## **1.5 Structure of dissertation**

This thesis consists of eight chapters, two appendices and one annex. Chapter 2 focuses on the basic content and structure of pollution prevention measures in the Polar Code. Chapter 3, 4, 5 and 6 are the basic chapters of this thesis, which describe the formulation process of each prevention pollution measure to prevent oil, NLS, sewage and garbage pollution in the Polar Code, and put forward corresponding interpretation, analysis and recommendations. Based on the previous four chapters, Chapter 7 gives the overall analysis, respectively from the amendments of specific provisions and the participations of different stakeholders. Chapter 8 summarizes the above interpretations, analyzes and recommendations. Appendix A is the author's proposal based on the proposed amendments, Annex is the needed amendments, and Appendix B is the information of relevant meetings to formulate the specific pollution prevention measures.

## **CHAPTER 2**

### **INTRODUCTION OF THE POLAR CODE AND ITS POLLUTION PREVENTION REQUIREMENTS**

#### **2.1 Polar Code**

##### **2.1.1 Introduction of the Polar Code**

In order to ensure the safety navigation and protect the fragile ecological environment in polar waters, the International Maritime Organization started the process of navigation legislation which was specifically suitable for the polar waters at the beginning of this century. These rules include the 2002"Arctic Guidelines", (IMO, 2002) the 2010"Polar Guidelines", (IMO, 2010a) and the legal hierarchy from the "Guidance Guidelines" into "Mandatory Code". On January 1, 2017, the International Code for Ships Operating in Polar Waters (Polar Code) came into force. (IMO, 2017a) As the first international rule applicable to the polar waters and has a mandatory nature, it has become a milestone in the governance of polar water. The Code has strengthened the obligations of the flag state, including the certification of polar ships, shipbuilding standards and environmental protection responsibilities, and will have a profound impact on the global shipping industry and Arctic maritime management.

##### **2.1.2 Basic structure of the Polar Code**

The Polar Code is mainly composed of two parts: Part I safety measures; Part II environmental protection measures. Part I is subdivided into two parts: part I-A

contains mandatory provisions on safety measures, covering construction, design, equipment, communications, operation, emergency rescue, seafarer training and so on; Part I-B contains recommendations on safety. Part II is also subdivided into two parts: part II-A contains mandatory provisions on pollution prevention, covering the discharge of oil, sewage, garbage and so on; part II-B includes recommendations on pollution prevention. (IMO, 2017b)

The frame of the Code is as follows in the figure 2.1.

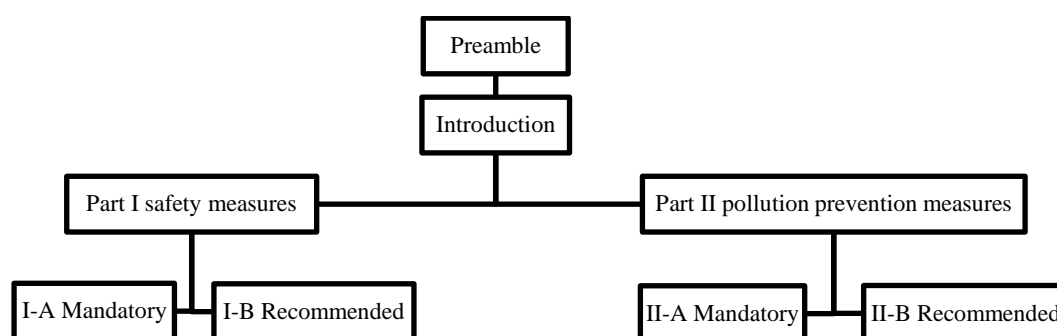


Figure 2.1 Basic structure of the Polar Code

Source: Compiled by the author based on the Polar Code

## 2.2 The pollution prevention measures of the Polar Code

### 2.2.1 Introduction of pollution prevention measures

The PART II-A (pollution prevention measures) is divided into five chapters, corresponding to the MARPOL convention's annexes to compensate for the blank of reducing the risk of navigation pollution in polar waters. The relative pollution prevention requirements in the rules are stricter than those in the MARPOL, and they are mainly manifested from the following five aspects. (SHMSA, 2015, p.2)

First, prevent oil pollution. The Antarctic standard will be extended to the Arctic

waters on the basis of Annex I of MARPOL, and the unified requirements for zero discharge of oil and sewage from polar ships will be required. In addition, according to the oil discharge restrictions, special requirements are also made for the separation of ship's oil tanks. (IMO, 2014a, p.38)

Second, control the pollution of noxious liquid substances in bulk. The provision of prohibiting the discharge of the noxious liquid substances in bulk in Antarctic area is extended to the Arctic waters, adding the approval procedure of carrying toxic liquid substances in new A and B category ship, and requiring approval by the authority. (IMO, 2014a, p.39)

Third, prevent pollution of sewage from ships. On the basis of the MARPOL convention, it increases the discharge restriction “as far as practicable from areas of ice concentration exceeding 1/10”. In addition, special provisions are made for newly built category A and category B vessels, passenger ships and ships operating in polar waters for a long time. (Fan, 2012)

Fourth, prevent pollution of garbage from ships. For the Arctic waters, more stringent regulations mainly from three aspects, they are food wastes, animal carcasses and cargo residues in MARPOL convention (2011) annex V Regulation 4. Moreover, the provisions of the Antarctic area are more stringent than those of the MARPOL. (IMO, 2014a, p.40)

Fifth, add the additional guidance of part B, combined with the mandatory part A to achieve the objectives in phases.

The following figure 2.2 provides a clear summary of the pollution prevention measures of Polar Code.

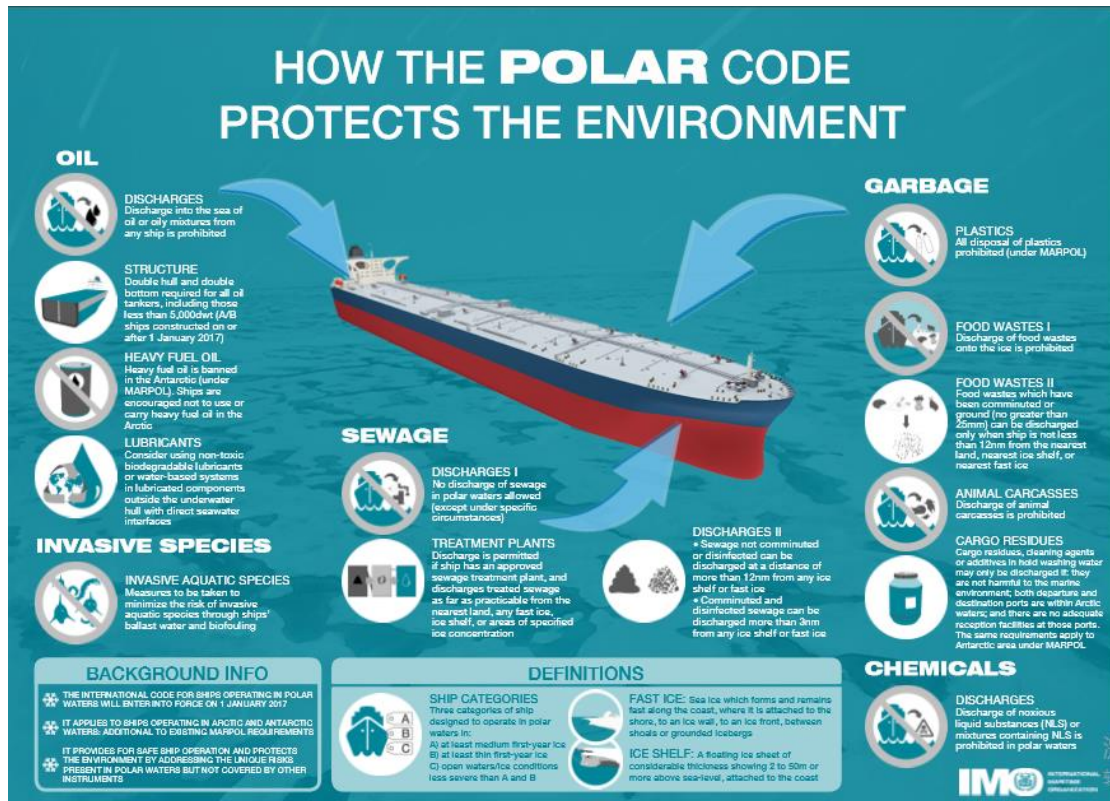


Figure 2.2 How the Polar Code protect the environment

Source: IMO, 2017a

### 2.2.2 Basic structure of the pollution prevention measures

The pollution prevention measures of the Polar Code are divided into two parts, respectively, part II-A "pollution prevention measures" and part II-B "addition guidance regarding the provisions of the introduction and part II-A". The former is a mandatory requirement, it is divided into 5 chapters, respectively, corresponding to MARPOL Annex I, II, III, IV, and V, requiring additional pollution prevention measures according to the special requirement of the polar environment. The latter is an additional supplement recommendation to the former.

Similarly, the framework of the pollution prevention measures as shown in the figure

2.3.

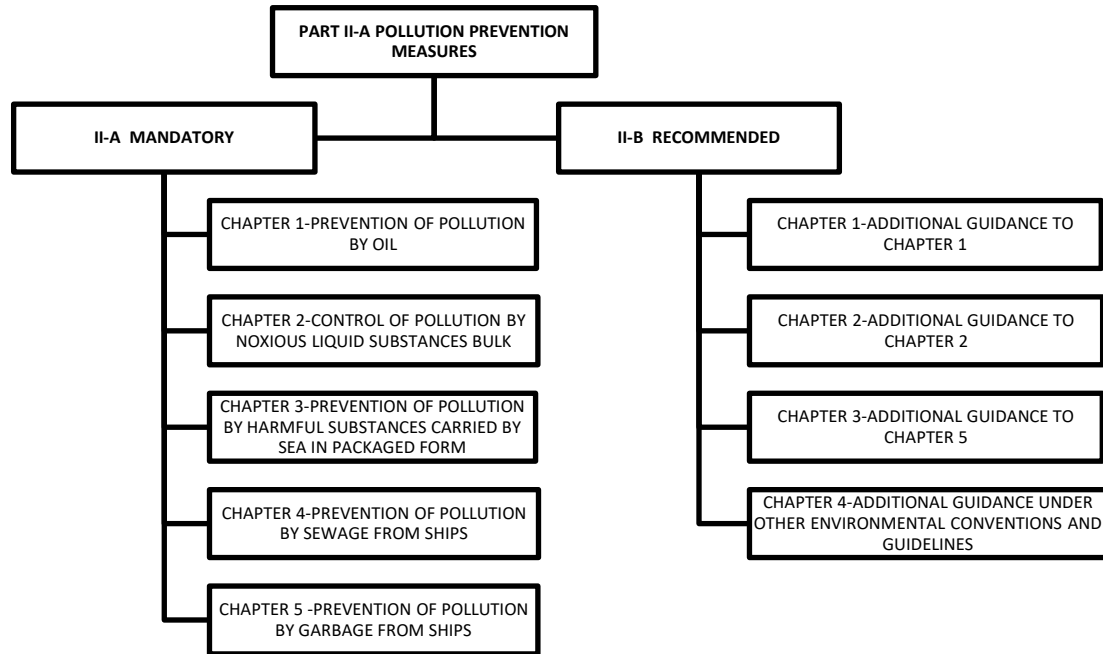


Figure 2.3 Basic structure of the pollution prevention measures in Polar Code

Source: Compiled by the author based on the Polar Code

### 2.3 Chapter summary

This chapter introduces the main contents and basic structure of the Polar Code and its pollution prevention measures. Through the description above, it can be seen that the pollution prevention measures of Polar Code are the additional requirements on the basis of MARPOL Annexes to the ships operated in polar waters, considering the special sensitive ecological environment of polar waters.

### **CHAPTER 3**

#### **INTERPRETATION AND ANALYSIS ON THE PREVENTION OF POLLUTION BY OIL**

From chapter 3 to chapter 6, the author will focus on interpretation and analysis on the provisions of pollution prevention measures of the Polar Code by referring to relevant proposals, reports and literature. These four chapters mainly include the following two parts:

- .1 Although the existing pollution prevention measures of the Polar Code remove goals and functional requirements(IMO,2014b,p51), these pollution prevention measures are actually based on the original goals and functional requirements. Therefore, to improve the understanding of the essence and intention of the Convention, these four chapters will introduce, interpret and analyze the formulation of the measures.
  
- .2 As an international Convention, the formulation of Polar Code involves different interests between countries. Through the analysis of different positions of stakeholders in the formulated process of pollution prevention measures, thereby we can accurately grasp the concerns of all the stakeholders, which will contribute to further amendment of the pollution prevention measures of the Polar Code.

### 3.1 Interpretation on specific provisions

#### 3.1.1 Operation requirements

*["1.1.1 In Arctic waters any discharge into the sea of oil or oily mixtures from any ship shall be prohibited.*

*1.1.2 The provisions of paragraph 1.1.1 shall not apply to the discharge of clean or segregated ballast. "]*

#### Formulation process:

Table 3.1 The formulation process of Regulation 1.1.1 and 1.1.2

Time	Formulation process
2010.11	Norway first proposed a ban on oil discharge in a proposal (IMO, 2010b). The proposal proposed to prohibit the discharge of oil and oil mixtures in the Arctic waters, as recommended by the MARPOL Convention on Antarctica.
2013.03	In the Working Group of the DE57, Norway led the detailed discussion of the control problem of oil discharge. Some delegates suggested that the measures to prevent oil pollution in the Arctic should be consistent with the Antarctic. Others believed that it was too strict. No agreement was reached at that meeting. (IMO, 2013a)
2013.05	After discussion, the MEPC65 agreed to prohibit discharging any oil and oil mixture into the sea. (IMO, 2013b)
2014.10	The MEPC67 Polar Code Working Group at that meeting reconfirmed that the ban on discharge was consistent with the Antarctic area under the Regulation 15 and 34 of MARPOL Annex I, but extended to the Arctic waters. (IMO, 2014c)

Source: Compiled by the author based on the relevant proposals

Regulation 1.1.2 was put forward by the United States at the Marine Environment Protection Committee (MEPC67) in October 2014 (IMO, 2014d). The Working Group of the meeting agreed to add this clause to clarify that the previous clause should not apply to the discharge of clean or segregated ballast.

#### Interpretation:

The circumstances are conducive to the formulation of Regulation 1.1.1, for the



following reasons:

- .1 The harsh natural environment of the polar area provide a realistic basis. Affected by the low temperature and polar night, it is not only difficult to detect the oil spill of ships in polar area, but also difficult to recover and decompose. (Cao, et al., 2011)
- .2 The existing conventions provide a legal basis. In this regard, Regulations 15.4 and 34.3 of the MARPOL convention require ships to prohibit the oil discharge in the Antarctic area. In addition, the Arctic 4(1) of Canadian “Arctic waters pollution prevention act (1985)” has also made corresponding requirements.
- .3 The applications of the zero discharge standards provided factual cases. The Antarctic area in MARPOL Convention has been required for the implementation of zero discharge for some categories of pollutants. At the MEPC66 , the Canadian delegation put forward the Arctic water pollution prevention system established in Canada in 1970 and successfully applied the system with zero discharge standards to all types of wastes. (IMO, 2014e)

*[“1.1.3 Subject to the approval of the Administration, a category A ship constructed before 1 January 2017 that cannot comply with paragraph 1.1.1 for oil or oily mixtures from machinery spaces and is operating continuously in Arctic waters for more than 30 days shall comply with paragraph 1.1.1 not later than the first intermediate or renewal survey, whichever comes first, one year after 1 January 2017. Until such date these ships shall comply with the discharge requirements of MARPOL Annex I regulation 15.3.” ]*

Formulation process:

Table 3.2 The formulation process of Regulation 1.1.3

Time	Formulation process
2014.01	At the SDC1, Russia submitted a proposal (IMO, 2013c), which considered that, in view of the long distance of voyage, complete prohibition of oil discharge from some ships, is too strict. The proposal required the permission of oil discharge as long as it complies with the requirements of Regulation 15.3, MARPOL Annex I. SDC1 recalled that the MEPC65 had agreed to completely prohibit the oil discharge, and did not approve the proposal.
2014.04	At the MEPC66, Russia submitted a proposal to the Committee with the same reason (IMO, 2014f), and added its necessity and feasibility. After discussion, the MEPC Working Group did not agree with the proposal on the grounds that it did not receive sufficient support.
2014.10	At the MEPC67, Russia continued to submit two proposals, the Working Group considered an exemption period of five years, put forward by a proposal (IMO, 2014g), allowing the ships with long-term operation (for at least 30 days) to discharge oil and oily mixture from the machinery space in Arctic waters and ice area. After discussion, the committee agreed to develop a gradual transition period for existing ships.

Source: Compiled by the author based on the relevant proposals

Interpretation:

It is not difficult to see that, Russia as the world's largest oil producer (U.S. Energy Information Administration, 2017, p168), had worked hard to promote the formulation of the provision from the beginning to the end. The first proposal submitted by Russia (IMO, 2013c) only proposed the oil discharge requirements in the ships' machinery space in the special area of the MARPOL convention could apply in the polar waters, and did not provide any supporting materials. In the second proposal (IMO, 2014f), the introduction of its necessity and feasibility was added. For example, the long-term operating ships that have difficulties with oil discharge (icebreakers, hydrographic ships and scientific ships etc.). Nevertheless, the proposal had not been adopted because of insufficient support.

Subsequently, Russia submitted the third proposal to the MEPC67 with the same content. In the fourth proposal which was submitted a few days later (IMO, 2014g),

the proposed oil pollution prevention measures was modified to add a five-year exemption period for the machinery spaces of existing category A ships, as long as they have long-term operation in polar area, aiming to provide the existing category A ships with the time to take corresponding measures. In the end, after comprehensive consideration, the Committee agreed to adopt a period of gradual adoption for 1-4 years, which was based on the limit of minimum to maximum time between the intermediate survey and the renewal survey.

For the proposed five-year exemption period, the author believes that Russia should elaborate its necessity, the measures needed and the difficulties in implementation, otherwise it will be difficult to be persuasive.

*["1.1.4 Operation in polar waters shall be taken into account, as appropriate, in the Oil Record Books, manuals and the shipboard oil pollution emergency plan or the shipboard marine pollution emergency plan as required by MARPOL Annex I."]*

Formulation process:

Table 3.3 The formulation process of Regulation 1.1.4

<b>Time</b>	<b>Formulation process</b>
2010.01	Norway submitted a proposal at the MEPC60 (IMO, 2010c), first proposed to equip with the corresponding oil pollution emergency plan and facilities on board in the polar waters.
2013.03	DE57 Working Group report required that all of the plans and records in the MARPOL, AFS and BWM Convention should consider the operation in the polar waters.(IMO, 2013a)
2013.08	DE57 correspondence group submitted a report to the Intersessional Working Group of Polar Code (IMO, 2013d), the group divided all the manuals, records and oil pollution emergency plan into two lists according to different functional requirements.
2014.07	According to the resolution of MEPC66 (IMO, 2014b, para.11.27), the draft Polar Code deleted all the goals and functional requirements, and then the two operational requirements were subsequently integrated.

Source: Compiled by the author based on the relevant proposals

### Interpretation:

In a proposal submitted by Norway at MEPC60, it was noted that ships passing through the polar area should have sufficient fuel to ensure safe passage, and there is a certain potential risk of oil spill. Therefore, it is necessary to formulate corresponding emergency plans and prepare adequate emergency equipment (IMO, 2010c).

At the beginning of the development of Polar Code, two functional requirements were set up. Besides controlling the operational oil discharge, the accidental oil spill should also be controlled (IMO, 2013d, 1.6.1). Oil record book, manual and oil pollution emergency plan on board are the important approaches to realize the two functional requirements.

In view of the provisions in the Polar Code, the author believes that the word "as appropriate" is too broad for specific implementation, and needs to be improved.

### **3.1.2 Structural requirements**

*[“ 1.2.1 For category A and B ships constructed on or after 1 January 2017 with an aggregate oil fuel capacity of less than 600 m<sup>3</sup>, all oil fuel tanks shall be separated from the outer shell by a distance of not less than 0.76 m. This provision does not apply to small oil fuel tanks with a maximum individual capacity not greater than 30m<sup>3</sup>.*

*1.2.2 For category A and B ships other than oil tankers constructed on or after 1 January 2017, all cargo tanks constructed and utilized to carry oil shall be separated from the outer shell by a distance of not less than 0.76 m.*

*1.2.3 For category A and B oil tankers of less than 5,000 DWT constructed on or after 1 January 2017, the entire cargo tank length shall be protected with:*

*.1 double bottom tanks or spaces complying with the applicable requirements of*

regulation 19.6.1 of MARPOL Annex I; and

.2 wing tanks or spaces arranged in accordance with regulation 19.3.1 of MARPOL Annex I and complying with the applicable requirements for distance referred to in regulation 19.6.2 of MARPOL Annex I.

1.2.4 For category A and B ships constructed on or after 1 January 2017 all oil residue (sludge) tanks and oily bilge water holding tanks shall be separated from the outer shell by a distance of not less than 0.76 m. This provision does not apply to small tanks with a maximum individual capacity not greater than 30m<sup>3</sup>.”]

Formulation process:

Table 3.4 The formulation process of Regulation 1.2

Time	Formulation process
2010	The original text was submitted by Norway at DE55 sub-committee in 2010 (IMO, 2010b, para.21.3.3). It was mentioned that "Tanks containing any pollutant including heavy fuel oil, shall be separated from double skin construction of at least 760 mm in width." Followed by the second year, the clause had been written into the DE55 sub-committee correspondence group report (IMO, 2011a, Annex, para.15.5).
2013.10	after the discussion of the intersessional Working Group on Polar Code (ISWG PC), it was considered that the requirements should be restricted to category A and category B ships, and exempt from the cabin carrying oil or oil mixtures in which the individual capacity is not more than 20 m <sup>3</sup> in the machinery space. (IMO, 2013e, Annex, para.1.7.2.2)
2014.04	The MEPC66 wrote this clause in the additional structural requirements of chapter 1, and distinguished the requirements between fuel tanks and cargo oil tank, which stipulates that the separate requirements shall be limited to the ship with the total amount of oil fuel less than 600 m <sup>3</sup> or the Deadweight less than 600 tonnage (DWT), while the single fuel capacity of the former exemption from 20 to 30m <sup>3</sup> . In addition, some representatives considered that the small residual oil tank and oil tank (such as not more than 30m <sup>3</sup> ) shall also be exempted from the separation requirements from the perspective of consistency. (IMO, 2014b)
2014.10	The MEPC67 intersessional Working Group agreed to this amendment above.
2015.03	China and South Korea indicated in a proposal submitted to the MEPC68 that, there is a potential loophole in Regulation 1.2.2 of the draft Polar Code that, it would place stricter structural requirements for ships of low fuel risk than those with high fuel risk (IMO, 2015a). After discussion, the committee decided to modify the original "600 DWT bellow" to "other than oil tanker", and add Regulation 1.2.3, demanding to protect the cargo tank length of oil tanker of less than 5000 DWT.

Source: Compiled by the author based on the relevant proposals

### Interpretation and comments:

Since category A and B ships are designed for operation in polar waters ([Polar code, 2017a](#)), structural requirements for the prevention of oil pollution in Polar Code are only for the newly constructed category A and B ships, as additional requirements for ships operating in polar waters. The interpretations to the specific clauses are as follows:

.1 Regulation 1.2.1 provides additional protection for fuel tanks. This clause requires to the structure of ships with an aggregate oil fuel capacity of less than  $600m^3$ , and fills the blank in MARPOL Annex I. It is intended to prevent a small amount of oil leakage.

.2 Regulations 1.2.2 and 1.2.3 provide additional protection for cargo tanks. The corresponding contents of MARPOL Convention are mainly in Regulation 19 of Annex I. In order to supplement the requirement of MARPOL convention of 600 DWT and above, Regulation 1.2.2 of the original Polar Code required category A and B ships (under 600 DWT), and later was renamed into category A and B ships other than oil tankers, filled the blank that the ships other than oil tankers (more than 600 DWT), carrying oil in bulk, don't have the structural requirements in draft Polar Code. ([IMO, 2015](#)) At the same time, on the basis of this proposal, the committee decided to increase the requirements for oil tankers (under 600 DWT), adding the existing requirement (600-5000 DWT) based on Regulation 19.6 of MARPOL Annex I ([2011](#)), i.e. for oil tankers of less than 5000 DWT.

.3 Regulation 1.2.4 provides additional protection for the residual oil (sludge) tanks. The corresponding contents are mainly stipulated in Regulations 12 and 29 of MARPOL Convention Annex I ([2011](#)), but there were no specified structural

requirements. Therefore, it is necessary to require it in polar waters.

In order to clearly describe the structural requirements for the prevention of oil pollution in the polar areas, the following table 3.5 compares the polar waters with the general waters in MARPOL Convention:

Table 3.5 Structure requirements comparison for the polar waters with the general waters

Areas	General water	Polar water
<b>Machinery spaces of all ships</b>	Shall be provided with <b>tanks to receive oil residues</b> ; Ships with an aggregate oil fuel capacity of $600m^3$ and above, oil fuel tanks shall be located above the moulded line of the bottom shell plating, and inboard of the moulded line of the side shell plating, nowhere less than 0.76m (12A.6,7,8); <b>Individual oil fuel tanks' capacity</b> shall not over $2500m^3$ .	Additional requirements: Ships with an aggregate oil fuel capacity of less than $600m^3$ , all oil fuel tanks shall be separated from the outer shell by a distance of not less than 0.76m.
<b>Cargo areas of oil tankers</b>	Oil tankers of 600-5000 DWT, should comply with regulation 19.3 and 19.4, or 19.6 in MARPOL Annex I; Oil tankers of 5000 DWT above, should comply with regulation 19.3; <b>Size and arrangement of cargo tanks</b> should comply with regulation 26.	Oil tankers of less than 5,000 DWT, the entire cargo tank length shall be protected with double bottom tanks or spaces complying with regulation 19.6 and 19.3.1 of MARPOL Annex I.
<b>Cargo tanks of ships other than oil tankers</b>	No separation requirements	All cargo tanks shall be separated from the outer shell by a distance of not less than 0.76m.
<b>Oil residue (sludge) tanks</b>	No separation requirements	All oil residue (sludge) tanks shall be separated from the outer shell by a distance of not less than 0.76m.

Source: Compiled by the author based on the Polar Code and MARPOL Convention

In fact, the polar rules only impose additional requirements on the areas not covered by the MARPOL convention. However, due to the special natural and ecological environment of polar waters, and based on the analysis of the table above, I think it is

necessary to put forward more stringent requirements in some areas.

- .1 The size of cargo tank can be further limited. Regulations 26 of MARPOL Annex I (2011) specify the size limits and layout arrangement of cargo tanks.
- .2 The total capacity and individual capacity of the tanks for oil residues can be further limited. Because the oil discharge is prohibited in the polar waters, in the case of insufficient reception facilities, ships would increase the capacity of tanks for oil residues, the capacity of these tanks needs to be controlled, and it could be a choice to take distinguished protection measures according to the different aggregate capacity of oil residues like the requirement of oil fuel tanks in MARPOL Annex I, 12A.6, 7, 8(2011).
- .3 The capacity of individual oil fuel tank can be further limited. Regulation 12A.5 of MARPOL Annex I provides no more than 2500m<sup>3</sup> of this capacity (2011).

### **3.1.3 Additional guidance**

The proposed additional guidance originated in November 2009 at the DE53 in Canada, referring to the prevailing rules, suggesting that the Polar Code be divided into a mandatory part (PART A) and recommended part (PART B). (IMO, 2009) Recalling the formulation of maritime conventions, such as MLC2006, STCW78/95, etc., were also combinations of mandatory and recommended guidelines to enhance the flexibility of the implementation of the Conventions. As a new international standard of comprehensive governance of polar navigation activities, the Polar Code involves the interests of many stakeholders. The one-size-fits-all mandatory norms are difficult to achieve, some provisions which are important but currently difficult to implement can be put into the recommended part. After summing up the experience



from the practice, decision can be made on whether to adopt, delete or modify it. This will help the new rules to enter into force and achieve the goals in phases.

*[“1.1 Ships are encouraged to apply regulation 43 of MARPOL Annex I when operating in Arctic waters.]*

Formulation process:

Table 3.6 The formulation process of Additional guidance Regulation 1.1

<b>Time</b>	<b>Formulation process</b>
2011.11	Environmental organizations such as FOEI submitted a proposal to the DE56 on the use of heavy oil in Arctic waters (IMO, 2011b).
2013.01	Environmental organizations such as FOEI submitted the additional information to the DE57 on the prohibition of the use of heavy oil in the Arctic waters. (IMO, 2013f) the Sub-Commission considered that the proposal contained too many political elements.
2013.05	After discussion at the MEPC65, most delegations believed that the use of heavy fuel for the specification of ships operating in the Arctic waters was premature. (IMO, 2013b, para.11.53)
2013.10	A report (IMO, 2013e) submitted by the Intersessional working group of Polar Code (ISWG PC), in its PART II-B section, proposed the prohibition of the use and carry heavy fuels in Antarctic area. Ships may, on a voluntary basis, do not use or carry heavy fuel in the Arctic waters.
2014.07	In order to avoid overlapping with the MARPOL convention, in the correspondence group report of the MEPC66(IMO, 2014h), Regulation 1.1 of additional guidance in the draft Polar Code was amended to encourage ships to apply regulation 43 of MARPOL Annex I when operating in Arctic waters.

Source: Compiled by the author based on the relevant proposals

Interpretation:

HFO has high toxicity, and it is easy to adhere to the animals’ feathers and fur, leading to hypothermia and death (Arctic Council, 2009). In addition, heavy oil burning will produce more black carbon than other fuels, and the black carbon will accelerate the melting of sea ice. (Azzara A. et al, 2015)

However, in practice, due to political and economic problems, the development of discharge restriction for heavy fuel oil is slow (IMO, 2013g), and it was only a recommended clause when the Polar Code entered into force. After that, in this regard, environmental organizations called for attention in the successive MEPC meetings (IMO, 2015b; IMO, 2016a; IMO, 2016b). The latest proposal MEPC71/16/4(IMO, 2017c) will be discussed at the MEPC71 in July 2017. However, the prohibition of the use or carriage of heavy fuel oil has not yet reached a global consensus. Russia strongly opposed it, for example, it submitted a proposal (IMO, 2016c) to the MEPC 70 provided that heavy fuel oil had a limited impact on polar waters. And in May 2017, in its proposal MEPC71/16/8 submitted to MEPC71, it was pointed out that distillate fuel oil did not solve practical problems, and that the Russian locals needed to rely on heavy fuel for heating, etc. (IMO, 2017d)

The discharge of heavy fuel oil has been one of the focuses of attention. In view of the fact that there is no uniform understanding among the parties, the author believes that a gradual prohibition method may be adopted. For example, for ships that use less heavy fuel oil, they may be required to complete the ban on the use and carriage of heavy fuel oil within 5 years. For the ships that use more of them, the period is 5-10 years, and within 15 years, the use and carriage shall be strictly prohibited.

*[1.2 Non-toxic biodegradable lubricants or water-based systems should be considered in lubricated components located outside the underwater hull with direct seawater interfaces, like shaft seals and slewing seals.]*

Formulation process:

Table 3.7 The formulation process of Additional guidance Regulation 1.2

Time	Formulation process
2010.11	a proposal submitted by Norway to the DE55 (IMO, 2010b) suggested that the leakage of underwater hull lubricants was a known problem, especially on ice. Environmental damage could be avoided by the use of non-toxic biodegradable lubricants or water-based systems.
2013.01	The co-proposal (IMO, 2013h) submitted by Denmark and other four countries to the DE57 suggested the use of such biodegradable lubricants or water-based systems.
2014.02	Finland submitted a proposal that such lubricants should be located in direct contact with seawater. (IMO, 2014m)

Source: Compiled by the author based on the relevant proposals

### Interpretation:

The leakage of lubricated components means additional unnecessary oil spills into polar waters. Once these discharges are attached to the ice, the possibility of dilution will be reduced. (IMO, 2013h)

## **3. 2 Analysis on prevention of pollution by oil**

### **3.2.1 Risk sources analysis based on the Fishbone Diagram**

We know that the existing pollution prevention measures of the Polar Code are based on the Goal-based standards (GBS) (although later removed in case of random explanation) (IMO, 2014i). This method is mainly from the perspective of risk, and it is relatively objective and scientific to reach the goals and functional requirements through the risk analysis, and then make the corresponding functional requirements.

This thesis will use the fishbone diagram to analyze the risk sources of oil pollution due to the special nature of polar waters. And then the thesis will analyze the reasonable of the existing pollution prevention measures and the other pollution prevention measures that can be taken.

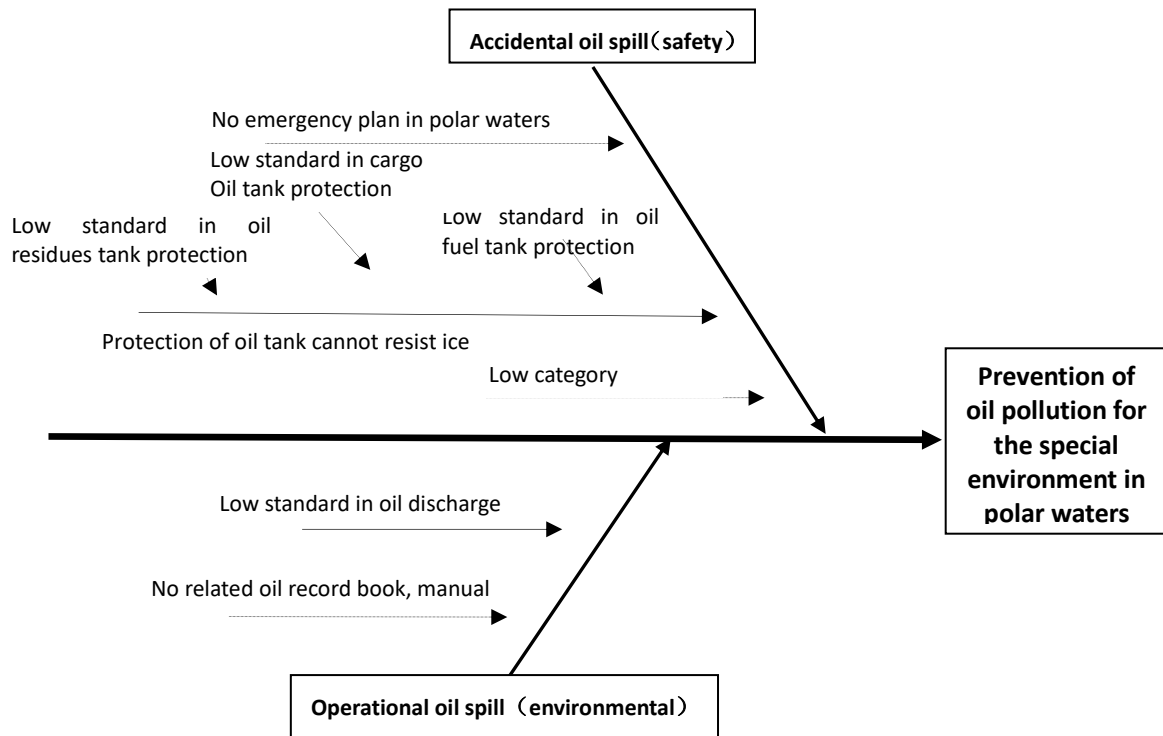


Figure 3.1 Risk sources analysis of oil pollution based on the Fishbone Diagram

Source: Compiled by the author based on the Polar Code and relevant proposals

It can be seen from the figure 3.1, ships oil spill are mainly from operational oil spill and accidental oil spill. In the case of operational oil spill, current polar waters require zero discharge (MARPOL, 2011), so the risk of operational oil spills is greatly reduced. In the case of accidental oil spill, the current Polar Code mainly concerns with the structural requirements. The overall mechanism of the emergency response is not systematically defined and established. Once a pollution accident happens, it is difficult to get effective control at the first time.

Therefore, the author believes that the establishment of a comprehensive emergency response system (such as ship equipment and shore facilities) should be the development direction of prevention of pollution by oil and NLS in the next stage of the Polar Code.

### 3.2.2 Statistical analysis of the proposals

In order to further analyze the participation and concerns of various countries, I have statistically analyzed the development of specific Regulations for the prevention of oil pollution. The relevant meetings are MEPC60, DE55 \ 56 \ 57, MEPC65, ISWG PC, SDC1, MEPC66, MEPC67 and MEPC68 respectively. There are 23 proposals that directly suggest or comment on prevention of pollution by oil. Russia submitted 6 proposals (lead or participate in, the same below) followed by Norway and the United States, each submitting 4 proposals. And then there are four Arctic countries (Denmark, Finland, Iceland, Canada), three environmental organizations (FOEI, WWF, PE), two flag states (Marshall islands, Panama), each of which submitted 2 proposals. And finally, each of the two Antarctic countries (New Zealand and Argentina), and three Shipbuilding countries (China, Japan, Korea) submitted 1 proposal. It is not difficult to see that basically every country which involved in the proposal has close interest in prevention of oil pollution in the polar waters.

As for the concerns of different countries, Russia was opposed to the prohibition of oil discharge; four of its six proposals were required to relax the prohibition, reflecting Russia's concern as the world's largest oil producer. Followed by Norway, three of the four proposals are the draft proposals on the overall provisions, which reflected Norway's enthusiasm for promoting the Code. In addition, the environmental organizations had the similar position with the developed countries, hoping to achieve more stringent environmental standards. The following figure3.2 illustrates the timeline of relevant proposals.

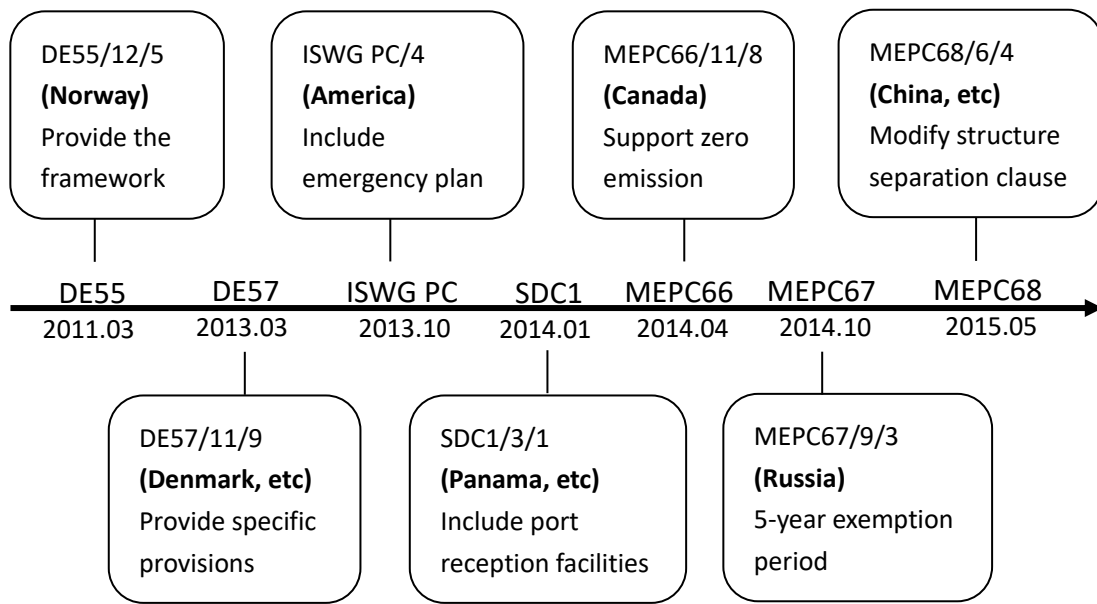


Figure 3.2 Timeline of relevant proposals on prevention of oil pollution

Source: Compiled by the author based on relevant proposals

In the follow-up amendments of prevention of pollution by oil, it is suggested to pay attention to the different concerns of different countries, such as coastal and flag States, technology exporting and importing countries, developed and developing countries, oil producers and oil users and so on.

### 3.3 Chapter summary and suggestions

This chapter focuses on the interpretation and analysis of the specific regulations for preventing oil pollution.

First of all, the author interprets the specific regulations. Additional mandatory oil pollution prevention measures are included in operational and structural requirements. The operational requirements mainly put forward two points. First, oil discharge is prohibited in the Arctic waters. As a major oil producer, Russia proposed to “relax” the requirements. Second, the corresponding record book, manual and contingency plan should consider the operation in polar waters, as appropriate. The author believes

that "as appropriate" is too broad, it is not conducive to implement. As for the structural requirements, it mainly restricts the small amount of oil spill which the MARPOL Convention does not specify. The author believes that the requirements for the large number of oil spills in the polar waters can be more stringent than that in the ordinary waters, due to the sensitive ecological environment. In addition, there was an extensively discussion about restrictions on the use and carriage of heavy fuels oil.

Secondly, the author analyzes the prevention of oil pollution in polar waters. Through the use of Fishbone Diagram to analyze the risk sources of oil pollution, it is concluded that the risk of oil pollution in polar waters is mainly from accidental oil spill. Based on the existing measures, the author believes that the current Polar Code lacks the requirements for an overall emergency response mechanism. Through the statistical analysis of the relevant proposals, the author found that different stakeholders have different concerns on oil pollution prevention. In order to facilitate the adoption of proposals quickly and efficiently, the author suggests that oil pollution prevention measures should be fully taken into account the concerns of different countries in the future.

Based on the interpretation and analysis above, the author has the following suggestions:

- .1 It is suggested that the "shall be taken into account, as appropriate" in regulation 1.1.4 be amended to "should include the contents of polar waters ".
- .2 It is suggested that the structural requirements of regulation 1.2 may further limit the size of cargo tanks of oil tankers, the total and individual maximum capacity of the residual tanks, and the maximum capacity of the oil fuel tanks.
- .3 It is suggested that the regulation 1.1 of additional guideline may take a gradual prohibition method with reference to regulation 1.1.3 of Part II-A.

.4 It is suggested to establish a comprehensive emergency response mechanism to prevent accidental spills.

.5 It is suggested that the concerns of different countries should be taken into account in the revision of the oil pollution prevention measures in the future.



**CHAPTER 4**

**INTERPRETATION AND ANALYSIS ON THE CONTROL OF POLLUTION  
BY  
NOXIOUS LIQUID SUBSTANCES IN BULK**

**4.1 Interpretation on specific provisions**

**4.1.1 Operational requirements**

*[“2.1.1 In Arctic waters any discharge into the sea of noxious liquid substances (NLS), or mixtures containing such substances, shall be prohibited.”]*

Formulation process:

Table 4.1 The formulation process of Regulation 2.1.1

Time	Formulation process
2013.03	The working group of the DE57 considered a co-proposal by five countries (IMO, 2013h), which agreed to ban the discharge of NLS in polar waters.
2013.10	The Intersessional Working Group (ISWG PC), after discussion, decided to add "or mixtures containing such substances" after “noxious liquid substances”. (IMO, 2013e)

Source: Compiled by the author based on relevant proposals

Interpretation:

It is noted that, in MARPOL annex II (2011), the Antarctic area also requires the prohibition of the discharge of any NLS or mixtures containing such substances into the sea.

*[“2.1.2 Operation in polar waters shall be taken into account, as appropriate, in the Cargo Record Book, the Manual and the shipboard marine pollution emergency plan for noxious liquid substances or the shipboard marine pollution emergency plan as required by MARPOL Annex II.”]*

Formulation process:

Table 4.2 The formulation process of Regulation 2.1.2

<b>Time</b>	<b>Formulation process</b>
2013.03	This Regulation was first put forward in the DE57 working group report (IMO, 2013i, Annex, para.15.3.1), requiring all plans and records in MARPOL should consider the operation of polar waters.
2013.08	At the DE57, the correspondence group listed the cargo record book, the Manual and the shipboard marine pollution emergency plan for NLS into two Regulations in accordance with two functional requirements. (IMO, 2013d)
2014.07	In accordance with MEPC66's resolution (IMO, 2014b, para. 11.27), these two Regulations were integrated.

Source: Compiled by the author based on relevant proposals

Interpretation:

As the same as the Regulation 1.1.4 in chapter 1 of the Polar Code, it is suggested that the meaning of the word "as appropriate" was not conducive to the implementation of the Code.

*[“2.1.3 For category A and B ships constructed on or after 1 January 2017, the carriage of NLS identified in chapter 17, column e, as ship type 3 or identified as NLS in chapter 18 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk in cargo tanks of type 3 ships shall be subject to the approval of the Administration. The results shall be reflected on the International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk or Certificate of Fitness identifying the operation in polar*

waters.” ]

Formulation process:

Table 4.3 The formulation process of Regulation 2.1.3

<b>Time</b>	<b>Formulation process</b>
2013.08	This is actually original from the protection of the tank. For the first time, it is stated that the NLS should be at least 760 mm from the outer hull in correspondence group report. (IMO, 2013d) In the discussion of the intersessional working group in October of that year, the application of this restriction was further limited to category A and B ships.
2014.01	At the SDC1 Working Group meeting, the Group noted that the structural requirements of the Polar Code would affect Type 3 chemical tankers, since the IBC Code did not have such requirement. The group agreed to submit this to MEPC for further consideration. (IMO, 2014j)
2014.10	At the MEPC67, the Intersessional Working Group agreed to add a clause to Part II-A, stipulating that the category A and B ships constructed on or after the date of entry into force, carrying the NLS of type 3 ship determined, should be approved by the Administration. (IMO, 2014k)
2014.10	after discussion, the Working Group agreed to insert the "cargo tanks of type 3 ships" in front of "be subject to the approval of the Administration" in 2.1.3 to clarify that only cargo tanks of type 3 ships should be Approved by the administration. (IMO, 2014c)

Source: Compiled by the author based on relevant proposals

Interpretation:

MARPOL (2011) Annex II Regulation 11.1 provides that the construction of ships carrying noxious liquid substances in bulk identified in chapter 17 of the International Bulk Chemical Code (IBC Code), shall comply with the requirements of the IBC Code.

Regulation 2.1.2.3 of the IBC Code (1988) has the definition of type 3 ship “A type 3 ship is a chemical tanker intended to transport chapter 17 products with sufficiently severe environmental and safety hazards which require a moderate degree of containment to increase survival capability in a damaged condition." Type 3 ships are

ships than can carry less dangerous goods than type 1 and type 2 ships.

IBC Rule requires the location of cargo tanks of type 1 and 2 ships, other than type 3. Thus, the regulation 2.1.3 in the Part II-A of Polar Code is intended to complement this gap.

The revised clause with a prerequisite for "shall be subject to the approval of the Administration" for the carriage of noxious liquid substances for type 3 ships and does not require structural requirements. The author believes that the requirement is vaguer, and not conducive for the unified implementation. Contrast with the structure requirements to prevent oil pollution, the structural requirements of controlling pollution from noxious liquid substances may also introduce the relevant provisions in the future.

#### **4.1.2 Additional guidance**

*[“Category A and B ships, constructed on or after 1 January 2017 and certified to carry noxious liquid substances (NLS), are encouraged to carry NLS identified in chapter 17, column e, as ship type 3 or identified as NLS in chapter 18 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, in tanks separated from the outer shell by a distance of not less than 760 mm.”]*

#### **Interpretation:**

This Regulation was established after discussion by the working group at the MEPC67 in October 2014(IMO, 2014c), aimed to supplement Regulation 2.1.3 of Part II-B.

## 4.2 Analysis on prevention of pollution by noxious liquid substances in bulk

### 4.2.1 Risk sources analysis based on Fishbone Diagram

Compared with oil, noxious liquid substances in bulk can also be used as cargo transport, and once leaked into the sea, both of them will damage the marine ecological environment. The difference is that the oil is from both of the cargo area and the machinery spaces, in addition to the environmental pollution, the oil may also cause fire, explosion and other accidents, so the control of pollution by oil should be more stringent than that of noxious liquid substances in bulk.

In the following, the author will continue to use the Fishbone analysis method to analyze the risk sources of pollution by noxious liquid substances in bulk due to the particularity of polar waters, and then to explore the rationality and other measures that can be taken to prevent the pollution by noxious liquid substances in bulk.

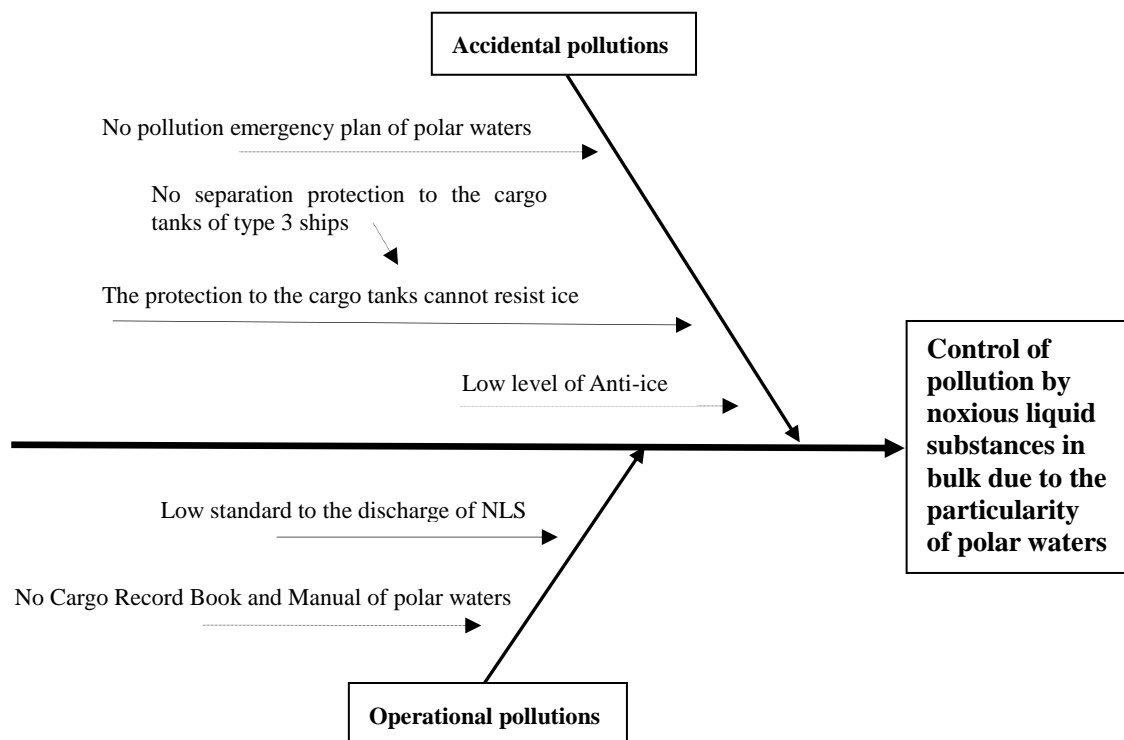


Figure 4.1 Risk sources analysis of pollution by noxious liquid substances in bulk based on the Fishbone Diagram

Source: Compiled by the author based on the Polar Code and relevant proposals

It can be seen from the above figure 4.1 that the main risk sources of noxious liquid substances in bulk in polar waters are from accidental pollutions. In order to control such pollution effectively, ships can refer to the additional guidance to Chapter 2 in the Part II-B of Polar Code, and clarify the structural requirements. In addition, the ship should be equipped with adequate emergency recovery equipment and a sound emergency response system should be established in polar waters.

#### **4.2.2 Statistical analysis of the proposals**

A total of 6 proposals related to the formulation of the specific content of this section. The relevant meetings are MEPC60, DE55, DE57, and ISWG PC respectively. Participating countries were: Norway, the United States, Denmark, Finland, Iceland, Russia, France and so on. Among them, each of the Norway and the United States participated in two proposals, and the rest of the countries involved in one proposal.

The formulation of this section had not been very controversial. Basically, the countries of Arctic Council leaded the development of this section. The discussion focused on the cargo tank protection of NLS in bulk, converted from the previous structural requirements to operational requirements. The specific development is shown in the Figure 4.2.

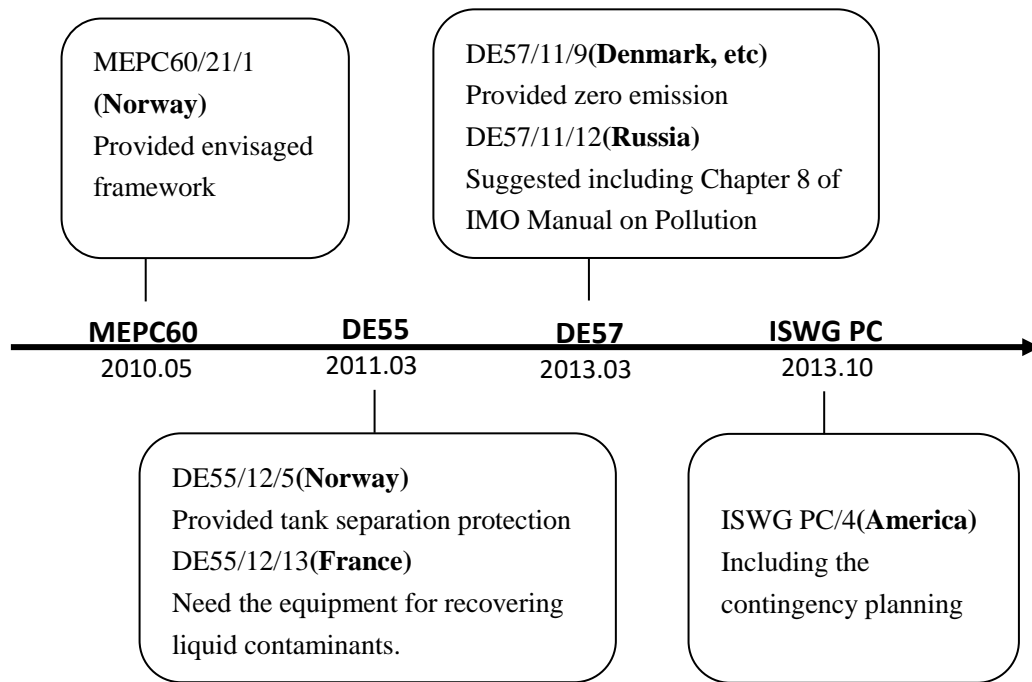


Figure 4.2 Timeline of relevant proposals on prevention of NLS pollution

Source: Compiled by the author based on relevant proposals

### 4.3 Chapter summary and suggestions

This chapter focuses on the interpretation and analysis of the specific regulations for control of pollution by NLS in bulk.

First of all, the author interprets the specific regulations. This part only includes the additional operational requirements. There are mainly three points. One is the prohibition of NLS discharge in the Arctic waters. It is noted that, in the MARPOL Convention, the Antarctic area has been banned from this kind of discharge. Second, the requirements for the record book, manual and contingency plan, as in the Chapter 3, should be made clear. Third, as for the requirements for carriage of NLS for type 3 ships “shall be subject to the approval of the Administration”, the author believes that the requirement is vaguer, and not conducive for the unified implementation. In addition, the requirement of the additional guidance directly stipulated the separation distance of tanks.

Secondly, the author analyzes the prevention of NLS pollution in polar waters. Through the use of Fishbone Diagram to analyze the risk sources of NLS pollution, it is concluded that the risk of NLS pollution in polar waters is also mainly from accidental NLS spill. But its structural requirements may be appropriate to relax due to its more slight pollution to the environment than oil. Through the statistical analysis of the relevant proposals, we can see that this part was less involved in countries and organizations, basically developed by the Arctic Council countries.

Based on the interpretation and analysis above, the author has the following suggestions:

- .1 It is suggested that the "shall be taken into account, as appropriate" in regulation 2.1.2 be amended to "should include the contents about polar waters".
- .2 It is suggested the regulation 2.1.3 should have uniform standard, and may be subject to the provision of the additional guidance, or referring to the model of chapters 4 and 5 of Part II-A, adding a definition to interpret the "be subject to the approval of the Administration".
- .3 It is suggested that accidental spills can be further prevented by improving structural requirements and establishing a comprehensive emergency response mechanism.



**CHAPTER 5**  
**INTERPRETAION AND ANALYSIS ON PREVENTION OF POLLUTION**  
**BY SEWAGE FROM SHIPS**

**5.1 Interpretation on specific provisions**

**5.1.1 Definitions**

*[“ 4.1.1 Constructed means a ship the keel of which is laid or which is at a similar stage of construction.*

*4.1.2 Ice-shelf means a floating ice sheet of considerable thickness showing 2 to 50 m or more above sea-level, attached to the coast.*

*4.1.3 Fast ice means sea ice which forms and remains fast along the coast, where it is attached to the shore, to an ice wall, to an ice front, between shoals or grounded icebergs.”]*

Formulation process:

In April 2014, at the MEPC66, it was suggested that the Polar Code Part II-A, chapter 4 should define the terms "construction" and "similar phase of construction". (IMO, 2014h)

In October 2014, the MEPC67 Intersessional Working Group decided to use the definitions of "constructed", "ice-shelf" and "fast ice" in the Polar Code Part II-A, chapter 4. The definition "constructed" was from MARPOL Annex I, and "ice

shelves" and "fixed ice" were from the World Meteorological Organization (WMO) Sea-Ice Nomenclature. (IMO, 2014k)

### **5.1.2 Operational requirements**

*[“ 4.2.1 Discharges of sewage within polar waters are prohibited except when performed in accordance with MARPOL Annex IV and the following requirements:*

*.1 the ship is discharging comminuted and disinfected sewage in accordance with regulation 11.1.1 of MARPOL Annex IV at a distance of more than 3 nautical miles from any ice-shelf or fast ice and shall be as far as practicable from areas of ice concentration exceeding 1/10; or*

*.2 the ship is discharging sewage that is not comminuted or disinfected in accordance with regulation 11.1.1 of MARPOL Annex IV and at a distance of more than 12 nautical miles from any ice-shelf or fast ice and shall be as far as practicable from areas of ice concentration exceeding 1/10; or*

*.3 the ship has in operation an approved sewage treatment plant<sup>20</sup> certified by the Administration to meet the operational requirements in either regulation 9.1.1 or 9.2.1 of MARPOL Annex IV, and discharges sewage in accordance with regulation 11.1.2 of Annex IV and shall be as far as practicable from the nearest land, any ice-shelf, fast ice or areas of ice concentration exceeding 1/10. ”*

*“4.2.2 Discharge of sewage into the sea is prohibited from category A and B ships constructed on or after 1 January 2017 and all passenger ships constructed on or after 1 January 2017, except when such discharges are in compliance with paragraph 4.2.1.3 of this chapter. ”]*

Formulation process:

Table 5.1 The formulation process of Regulation 4.2.1 and 4.2.2

Time	Formulation process
2010.11	Norway submitted a proposal (IMO, 2010b), it provided that specific emissions in MARPOL should be limited by the distance between land and ice cover waters.
2011.11	The DE55 correspondence group report was submitted to prohibit the discharge of untreated sewage and gray water for the ship carrying more than a certain number of persons. (IMO, 2011a)
2013.01	A joint proposal (IMO, 2013h) submitted by five countries suggested that discharge of sewage, which occurred relatively close to the ice (such as category A and B vessels), should be treated because these sewage could be attached to the ice, and may reduce the dilution. In addition, as the largest potential source of sewage, the discharge of passenger ships is worthy of attention.
2014.10	The MEPC67 Polar Code Intersessional Working Group agreed to include a reference to MARPOL Annex IV.(IMO, 2014k)

Source: Compiled by the author based on relevant proposals

Interpretation:

In the formulation process, some delegates asked why the ban on the discharge of sewage was only applicable to new category A and B ships and all passenger ships, the Working Group explained that if these ships were not equipped with sewage treatment plants, they would generate more sewage in the ice area. (IMO, 2014h)

There was a discussion in the MEPC67 about whether it should refer to MARPOL Annex IV or not. (IMO, 2014l)

Some opposed the reference, and supposed that in order to maintain the same type and method as the other chapters of the Code and other IMO Conventions, part II-A should not contain the corresponding reference to the MARPOL Annex, otherwise it would be amended as soon as MARPOL was amended.

Some supported this kind of reference. They believed that it provided more explicit discharge requirements for sewage from ships. Removing references may cause

confusion. Finally, the Working Group agreed to keep the references.

*[“4.2.3 Notwithstanding the requirements of paragraph 4.2.1, category A and B ships that operate in areas of ice concentrations exceeding 1/10 for extended periods of time, may only discharge sewage using an approved sewage treatment plant certified by the Administration to meet the operational requirements in either regulation 9.1.1 or 9.2.1 of MARPOL Annex IV. Such discharges shall be subject to the approval by the Administration.”]*

Formulation process:

Table 5.2 The formulation process of Regulation 4.2.3

Time	Formulation process
2013.01	This was first proposed by a co-proposal at the DE57 (IMO, 2013h), aimed to provide an exemption for ships operating in the ice for a long time to meet discharge requirements.
2014.04	The Working Group of MEPC67 agreed to delete the last sentence of Regulation 4.2.3 "should be marked on ISPP certificate".(IMO, 2014c)

Source: Compiled by the author based on relevant proposals

Interpretation:

As to “shall be subject to the approval by the Administration”, at the DE57, the representative of Canada noted that the discharge should be approved by the Administration of flag states, which could affect the interests of the coastal States, so they retained their positions on the issue. (IMO, 2013g)

In addition, with regard to the need to clarify the term "extended periods of time", the MEPC67 Working Group agreed that this should be subject to the discretion of the Administration, taking into account the ship size, the number of passengers and the ship operations. (IMO, 2014c)

The author believes that the interpretation of working group is reasonable, but without united requirements, it will increase the operational difficulty and weaken the mandatory of the Code.

## 5.2 Analysis on prevention of pollution by sewage from ships

### 5.2.1 Risk sources analysis based on Fishbone Diagram

Due to the sensitive ecological environment of polar waters, the discharges of sewage in the ice area would pollute the polar environment. Moreover, the passenger ships in the polar waters will cause more serious pollution.

In the following, the author will continue to use the Fishbone analysis method to analyze the risk sources of pollution by sewage from ships due to the particularity of polar waters.

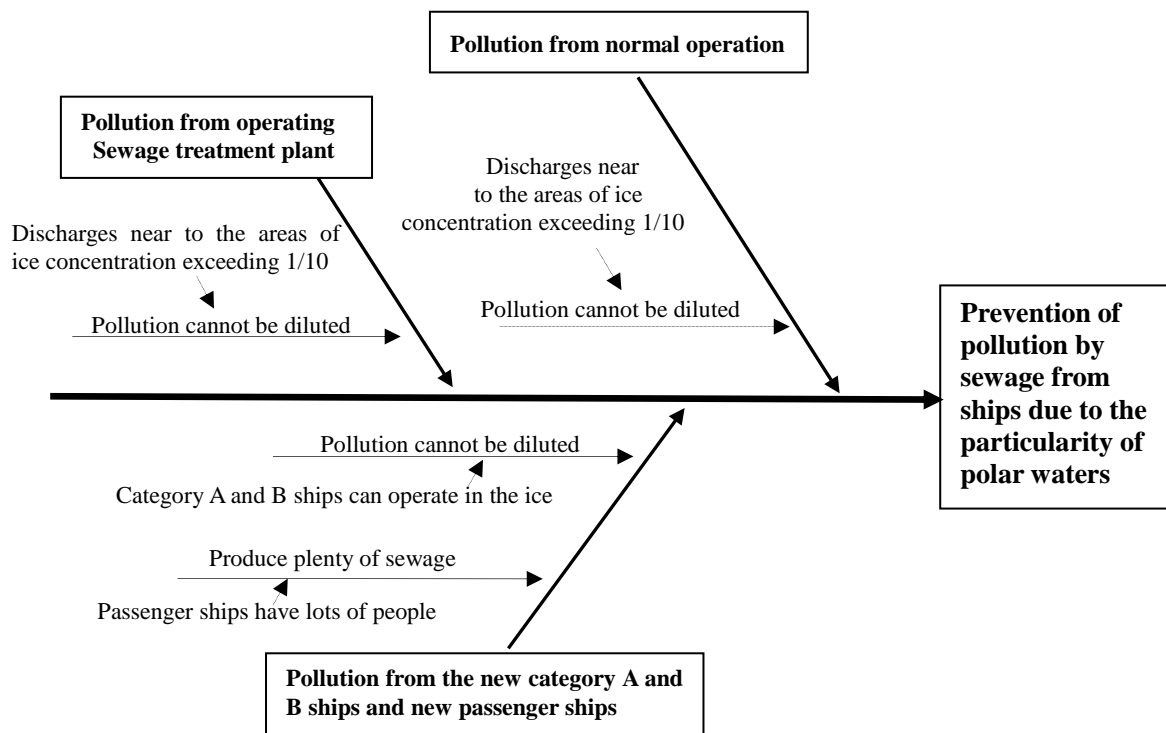


Figure 5.1 Risk sources analysis of pollution by sewage from ships based on the Fishbone Diagram

Source: Compiled by the author based on the Polar Code and relevant proposals

As can be seen from the figure 5.1, although the different ways of sewage from ships, but the threats of sewage from ships to the polar waters are mainly due to the discharge places are too close to the ice area, and the discharges on the ice are not easy to be diluted. Therefore, in the future, the author believes that the operational requirements to the sewage discharges will be a development direction.

### **5.2.2 Comparative analysis of the requirements for the discharge**

In the following table 5.3, I will further analyze the rationality of the current provisions by comparing the requirements of sewage discharge in the MARPOL Convention and Polar Code.

Table 5.3 Comparison of sewage discharge requirements in the MARPOL Convention and Polar Code

Requirements	ships other than passenger ships in all areas and passenger ships outside special areas	Passenger ships in the special area	Polar waters
General requirements	Discharge comminuted and disinfected sewage, more than 3nm from the nearest land; sewage which is not comminuted or disinfected, more than 12 nm; sewage shall not be discharged instantaneously but at a moderate rate when the ship is not less than 4 kn; The ship has in operation an sewage treatment plant, the effluent shall not produce visible floating solids or cause discoloration.	Prohibit discharges except such discharges are in compliance with regulation 9.2.1 of Annex IV. (sewage treatment plant)	Additional requirements:  The discharge should be as far as practicable from the nearest land, any ice-shelf, fast ice or areas of ice concentration exceeding 1/10. <b>The sewage discharge of new category A and B ships and new passenger ships is prohibited except such discharge is in compliance with regulation 4.2.1.3 of the Polar Code.(sewage treatment plant)</b>
Other requirements	Ships operating in the waters under the jurisdiction of a State can apply less stringent requirements.		Additional requirements: category A and B ships operated in areas of ice concentration exceeding 1/10 for extended periods of time, can only use sewage treatment plant.
	When the sewage is mixed with wastes covered by other Annexes, the requirements of other Annexes shall also be complied with.		

Source: Compiled by the author based on the Polar Code and MARPOL Convention

As to the discharge requirement for the new category A and B ships and new passenger ships in regulation 4.2.2 of the Polar Code, Part II-A , in accordance with the interpretation of the MEPC 66 correspondence group (IMO, 2014h), this is because the group considered that these ships could produce a large number of sewage in the ice areas. This regulation is consistent with the discharge requirements for passenger ships in the special area of the MARPOL Convention, which I think is

too strict. The reasons are as follows:

- .1 There is a situation that when the ship's sewage treatment plant fails, the ship cannot reasonably discharge sewage.
- .2 Although the "one-size-fits-all" approach to the discharge of ships is easy to implement, it does not meet the previous Goal-Based Standards principle, so it is not objective and reasonable.
- .3 It is difficult to completely ban the discharge of sewage from ships in the polar waters. First, unlike the discharge of oil, ships, especially passenger ships produce a large amount of sewage every day, and then the capacity of holding tank is insufficient. Second, unlike the special area of MARPOL Annex IV, the port reception facilities in the polar areas are inadequate. This makes it difficult to achieve zero discharge in polar waters when the ship's sewage treatment plant fails, which may lead to illegal discharge.

Prior to the sufficient sewage reception facilities be equipped in the polar waters, it is suggested that this kind of discharge could be permitted under the condition of increasing discharge distance. For example, it can be specified as follows:

Discharge of sewage into the sea is prohibited from new category A and B ships and new passenger ships, except when such discharges are in compliance with the regulation 4.2.1.3. If this condition cannot be achieved, these ships should discharge comminuted and disinfected sewage at a distance of more than 12 nm from any ice-shelf or fast ice, and discharge sewage that is not comminuted or disinfected at a distance of more than 24 nm from any ice-shelf or fast ice.



### 5.2.3 Statistical analysis of the proposals

There are seven proposals relating to the specific regulations for the prevention of pollution by sewage from ships. The relevant meetings are MEPC60, DE55, DE57, MEPC66 and MEPC67 respectively. Participating countries and organizations are Norway, the United States, Denmark, Finland, Iceland, Argentina, FOEI, WWF, PE, IFAW and so on. Among them, Norway participated in three proposals; the United States, FOEI, WWF and PE participated in two proposals, the remaining countries and organizations involved in one proposal.

It is noted that the main content of this part is led by the Arctic Council countries and environmental organizations, it is suggested that other relevant countries or organizations should also be actively involved, indicating their positions and concerns. The flow chart of specific proposals can be seen in the Figure 5.2.

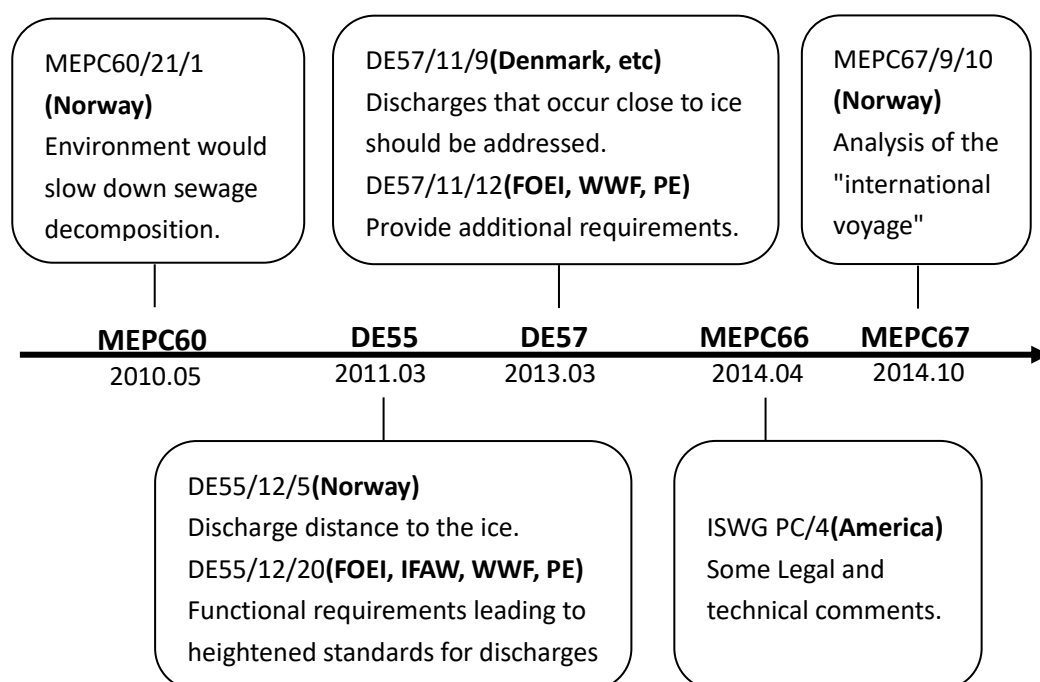


Figure 5.2 Timeline of relevant proposals on prevention of sewage pollution

Source: Compiled by the author based on relevant proposals

### **5.3 Chapter summary and suggestions**

This chapter focuses on the interpretation and analysis of the specific regulations for prevention of pollution by sewage from ships.

First of all, the author interprets the specific regulations. This part mainly includes the additional operational requirements. There are mainly three points. First, it increases the limits to the discharge distance from the ice concentration areas for ships, based on the discharge requirements of MARPOL Annex IV. Second, the new class A, B and the new passenger ships are stipulated to the equivalent of discharge requirements of passenger ship in special area of MARPOL Annex IV. Third, it is appropriate to "relax" the requirements for the discharge of category A and B ships operating in ice concentration areas for extended periods of time.

Secondly, the author analyzes the prevention of sewage pollution in polar waters. Through the use of Fishbone Diagram to analyze the risk sources of sewage pollution, it is concluded that they are mainly from the operational discharge of ships. Comparing with the original discharge requirements of MARPOL Annex IV, it was found that, according to the regulation, once the sewage treatment plant fails the new category A and B and new passenger ships could not legally discharge sewage in polar waters. Through the analysis of the proposals, this part is still mainly the Arctic Council countries and environmental organizations led the development.

Based on the interpretation and analysis above, the author has the following suggestions:

- .1 It is suggested that, prior to the sufficient sewage reception facilities be equipped

in the polar waters, the sewage discharge of new category A and B and new passenger ships could be permitted under the condition of increasing discharge distance from land, ice-shelf and fast ice.

.2 With regard to the interpretation of "for extended periods of time" in regulation 4.2.3 by the MEPC67 Working Group, the effectiveness of the provision was weakened. It is suggested to determine the specific time, such as 30 days, referring to the regulation 1.1.3 of PART II-A.

.3 It is suggested that all parties should continually study on the operational requirements for the prevention of pollution by sewage from ships.

**CHAPTER 6**  
**INTERPRETATION AND ANALYSIS ON PREVENTION OF POLLUTION**  
**BY GARBAGE FROM SHIPS**

**6.1 Interpretation on specific provisions**

**6.1.1 Definitions and operational requirements**

*[“ 5.1.1 Ice-shelf means a floating ice sheet of considerable thickness showing 2 to 50 m or more above sea-level, attached to the coast.*

*5.1.2 Fast ice means sea ice which forms and remains fast along the coast, where it is attached to the shore, to an ice wall, to an ice front, between shoals or grounded icebergs.*

*5.2.1 In Arctic waters, discharge of garbage into the sea permitted in accordance with regulation 4 of MARPOL Annex V, shall meet the following additional requirements:*

*.1 discharge into the sea of food wastes is only permitted when the ship is as far as practicable from areas of ice concentration exceeding 1/10, but in any case not less than 12 nautical miles from the nearest land, nearest ice-shelf, or nearest fast ice;*

*.2 food wastes shall be comminuted or ground and shall be capable of passing through a screen with openings no greater than 25 mm. Food wastes shall not be contaminated by any other garbage type;*

*.3 food wastes shall not be discharged onto the ice;*

*.4 discharge of animal carcasses is prohibited; and”]*

### Formulation process:

Table 6.1 The formulation process of Regulation 5.1.1-5.2.1.4

<b>Time</b>	<b>Formulation process</b>
2010.11	The initial discharge limitation of food waste was proposed from the Norway in 2010(IMO, 2010b), which states that this kind of discharge should be not less than 12 nautical miles from the nearest land and ice area. In addition to the above, the subsequent DE55 correspondence group report (IMO, 2011a) provided that the terms of the animal carcasses should not be discharged to polar waters.
2013.03	In the DE57 Working Group Report (IMO, 2013i), based on the pollution prevention measures proposed at the above meetings, it was further requested that the food waste should be comminuted or ground and be capable of passing through a screen with openings no greater than 25 mm, and it shall not be contaminated by any other garbage type. In addition, the report also provides the necessary condition for the discharge of food waste was en route.
2014.07	The correspondence group report submitted by MEPC66 (IMO, 2014h) separately described the requirements of the Antarctic area and Arctic waters.
2014.10	After discussion, the MEPC67 Intersessional Working Group contained a reference to MARPOL Annex V (IMO, 2014k), followed by the MEPC67 Working Group meeting, which agreed to the definition submitted by the intersessional working group. (IMO, 2014c)

Source: Compiled by the author based on relevant proposals

### Interpretation:

According to the Code, the additional requirements for Arctic waters are only for the discharge of garbage in Regulation 4 of MARPOL Annex V, that is, the discharge outside special areas. By comparing the provisions of MARPOL Convention and Polar Code with respect to the operational requirements for the prevention of pollution by garbage from ships, the requirements of the polar Code basically provided the additional requirements based on the discharge requirements of the special area, considering the sensitive circumstances of the polar areas.

*["5.2.1.5 discharge of cargo residues that cannot be recovered using commonly available methods for unloading shall only be permitted while the ship is en route and*

where all the following conditions are satisfied:

.1 cargo residues, cleaning agents or additives, contained in hold washing water do not include any substances classified as harmful to the marine environment, taking into account guidelines developed by the Organization;

.2 both the port of departure and the next port of destination are within Arctic waters and the ship will not transit outside Arctic waters between those ports;

.3 no adequate reception facilities are available at those ports taking into account guidelines developed by the Organization; and

.4 where the conditions of subparagraphs 5.2.1.5.1, 5.2.1.5.2 and 5.2.1.5.3 of this paragraph have been fulfilled, discharge of cargo hold washing water containing residues shall be made as far as practicable from areas of ice concentration exceeding 1/10, but in any case not less than 12 nautical miles from the nearest land, nearest ice shelf, or nearest fast ice. ”]

Formulation process:

Table 6.2 The formulation process of Regulation 5.2.1.5

Time	Formulation process
2011.11	The DE55 correspondence report (IMO, 2011a) provided that the hold washing water containing non recoverable residues, cleaning agents or additives, should not be discharged into polar waters.
2013.03	The joint proposal DE57/11/9 suggested that, when the cargo tanks, decks and outer surfaces were harmless to the marine environment, they can be discharged. (IMO, 2013h) But in the DE57 Working Group report (IMO, 2013i), it was decided to "prohibit the discharge of any garbage and cargo residues" as an option in chapter 5, but then in August of that year, the correspondence group report deleted it. (IMO, 2013d)
2014.07	In the MEPC66 correspondence group report (IMO, 2014h), one representative suggested that the minimum distance limits which had been applied to food waste should also be applied to the cargo residues for the sake of consistency.
2014.10	The MEPC67 working group, upon consideration, agreed that the discharge requirements for cargo residues in the Antarctic area in the MARPOL Annex V, Regulation 6.1.2 shall be extended to the Arctic waters.(IMO, 2014c)

Source: Compiled by the author based on relevant proposals

Interpretation:

The stipulation of the cargo residue was initially referred to the MARPOL Annex V6.1.2 amendment (IMO, 2011c). And then it further developed according to the sensitive environment of polar waters.

*[“5.2.2 In the Antarctic area, discharge of garbage into the sea permitted in accordance with regulation 6 of MARPOL Annex V, shall meet the following additional requirements:*

*.1 discharges under regulation 6.1 of MARPOL Annex V shall be as far as practicable from areas of ice concentration exceeding 1/10, but in any case not less than 12 nautical miles from the nearest fast ice; and*

*.2 food waste shall not be discharged onto ice. ”]*

Interpretation:

This regulation is based primarily on the revised MARPOL Annex V (IMO, 2011c), increasing the distance restrict for "fast ice" on the basis of existing requirements for discharge in special areas. In addition, considering that direct discharge onto ice is difficult to break down, the regulation stipulates that the food waste should not be discharged onto ice in the polar areas.

*[“5.2.3 Operation in polar waters shall be taken into account, as appropriate, in the Garbage Record Book, Garbage Management Plan and the placards as required by MARPOL Annex V.”]*

Interpretation:

In March 2013, the DE57 working group report first provided that all plans and records required by the MARPOL Convention should take into account the operation

of polar waters. (IMO, 2013i)

### **6.1.2 Additional guidance**

*[“In order to minimize the risks associated with animal cargo mortalities, consideration should be given to how animal carcasses will be managed, treated, and stored on board when ships carrying such cargo are operating in polar waters. Reference is made in particular to the 2012 Guidelines for the implementation of MARPOL Annex V (resolution MEPC.219(63), as amended by resolution MEPC.239(65)) and the 2012 Guidelines for the development of garbage management plans (resolution MEPC.220(63)). ”]*

#### **Interpretation:**

This Regulation was first proposed in March 2013, in Part B, X.5 of the report submitted by the DE57 Working Group. (IMO, 2013i) In August 2013, in the report submitted by the DE57 correspondence group (IMO, 2013d), this Regulation was listed separately as an additional guidance to Chapter 5.

## **6.2 Analysis on prevention of pollution by garbage from ships**

### **6.2.1 Risk sources analysis based on Fishbone Diagram**

The author will continue to use the Fishbone analysis method to analyze the risk sources of pollution by garbage from ships due to the particularity of polar waters.



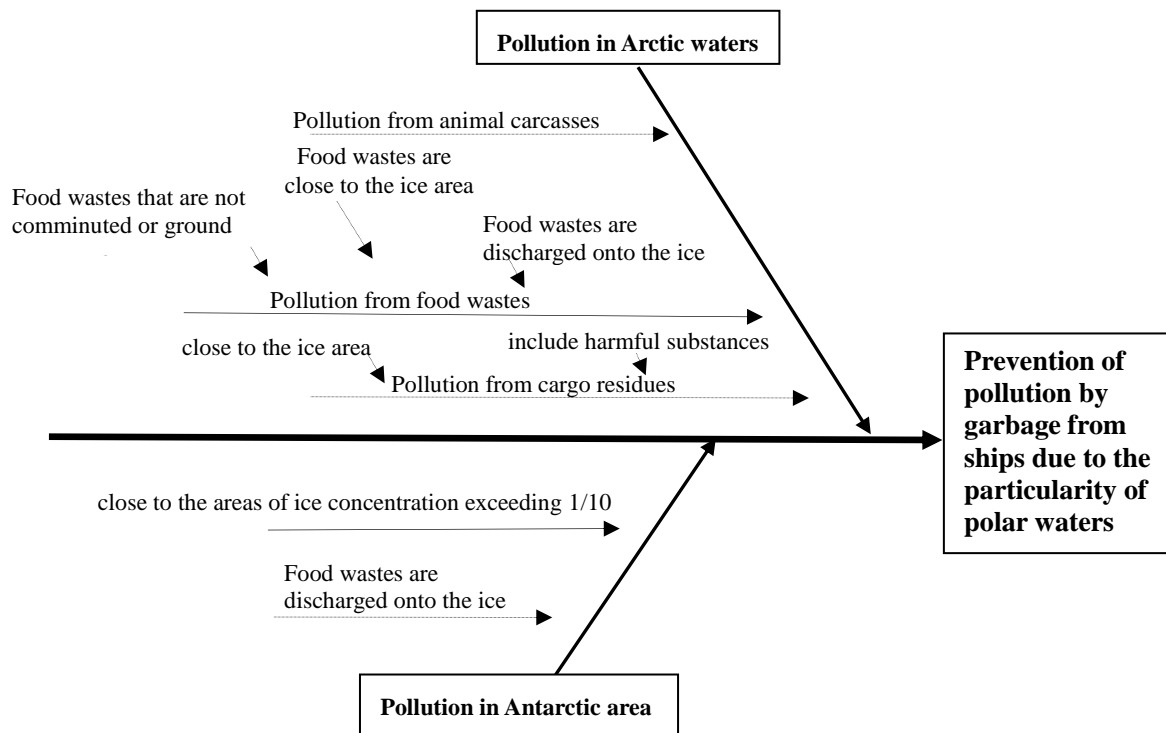


Figure 6.1 Risk sources analysis of pollution by garbage from ships based on the Fishbone Diagram

Source: Compiled by the author based on the Polar Code and relevant proposals

Through the analysis of this figure, we can see that the risk sources of pollution by garbage to Arctic waters are mainly based on the provisions of special areas in MARPOL Convention, such as pollution by the food wastes without comminuting, pollution by cargo residues and so on. In addition, some unique risk sources of pollution in polar waters are also contained, such as discharges are close to the ice areas, food wastes are discharged directly onto the ice and so on.

### 6.2.2 Comparative analysis of the requirements for the discharge

In order to clearly reflect the additional requirements of the Polar Code for the

discharge of garbage based on the MARPOL Convention, the following table 6.3 compares their requirements.

Table 6.3 Comparison of garbage discharge requirements in the MARPOL Convention and the Polar Code

Types of garbage		Within special areas		Outside special areas	
		Other areas	Antarctic area	Other areas	Arctic waters
<b>Plastics</b>		Prohibit discharge		Prohibit discharge	
<b>Cooking oil</b>		Prohibit discharge		Prohibit discharge	
<b>Food wastes</b>	Be ground and pass through a screen with openings no greater than 25 mm.	En route; as far as practicable from the nearest land, but not less than 12 nm from the nearest land or ice shelf; not be contaminated by any other garbage type.	The same as the requirements of Arctic waters. Add “Prohibit the discharge of introduced avian products.”	En route; not less than 3 nm from the nearest land.	Additional requirements: as far as practicable from areas of ice concentration exceeding 1/10; not less than 12 nm from the nearest land, ice-shelf, or fast ice; not be contaminated by any other garbage type; not be discharged onto the ice.
	Not be ground	Prohibit discharge		En route; not less than 12 nm from the nearest land.	Prohibit discharge
<b>Animal carcasses</b>		Prohibit discharge		En route; as far from the nearest land as possible, no less than 100 nm and in the deepest water.	Prohibit discharge
<b>Cargo residues</b>	HME	Prohibit discharge		Prohibit discharge	
	Not include HME	Discharge can be permitted under the following conditions: En route; Port of departure and next port of destination are within special area; adequate reception facilities; not less than 12 nm from the nearest land or ice shelf.	The same as the requirements of Arctic waters.	En route; not less than 12 nm from the nearest land.	Basically, discharge standards are the same as those in special areas, add “as far as practicable from areas of ice concentration exceeding 1/10; not less than 12 nm from the nearest fast ice.”
<b>Other garbage</b>		Prohibit discharge		Prohibit discharge	

Source: Compiled by the author based on the Polar Code and MARPOL Convention

Through the comparison of the discharge restrictions of garbage, we can see that the garbage that can be discharged in the polar areas is limited to the required food wastes and cargo residues. Although the Arctic waters are still non-special areas, the measures taken in the Arctic waters are in fact referring to the measures within special areas.

By comparing the Arctic waters and other special areas, the Arctic waters add the requirements that ships should be far away from the concentrated ice and food wastes should not be discharged onto the ice.

By comparing the Arctic and Antarctic areas, there is no discharge prohibition of introduced avian products in Arctic waters.

Based on this, taking into account the different additional requirements for the Antarctic and Arctic area in this section, the discharge requirements are almost no difference between the Antarctic area and Arctic waters. In addition, these requirements cover the requirements in special areas. In order to facilitate understanding and implementation, it is suggested that the Arctic waters designated as a special area, and based on the original requirements, additional measures to prevent the pollution by garbage from ships in polar waters can be put forward.

In addition, comparing the requirements of the Chapter 4 in the Part II-A of Polar Code, Chapter 4 provides no sewage discharge requirements for the new category A and B ships, as well as the new passenger ships. In addition, the Chapter 4 “relaxes” the requirements for the ships operating in ice areas for extended periods of time. The author believes that Chapter 5 should also provide appropriate provisions of garbage discharge for these three types of ships.

For example, it may be stipulated as follows:

- .1 Restrict the garbage discharge of new category A and B ships and new passenger ships. It is suggested to restrict the distance, amount and rate of the discharges. Such as discharge distance of more than 24 nm.
- .2 Restrictions may be relaxed for ships operating in areas of ice concentrations exceeding 1/10 for extended periods of time. Such as shorten the required discharge distance.

### **6.2.3 Statistical analysis of the proposals**

During the meetings on the development of the Polar Code, a total of 7 proposals directly proposed or commented on the prevention measures of pollution by garbage from ships. The relevant meetings are MEPC60, DE55, DE56, DE57, and MEPC67 respectively. Among them, Norway participated in three proposals, the United States, FOEI, WWF participated in two, the remaining countries or organizations participated in one. And similar to the prevention of pollution by sewage from ships, mainly the polar countries and environmental organizations involved in the development of this section. Since the content of this section mainly provides the equivalent requirements of MARPOL Annex V special areas to the Arctic waters, there were no many disputes in the process of formulation. Specific details of the development process are in the figure 6.2.

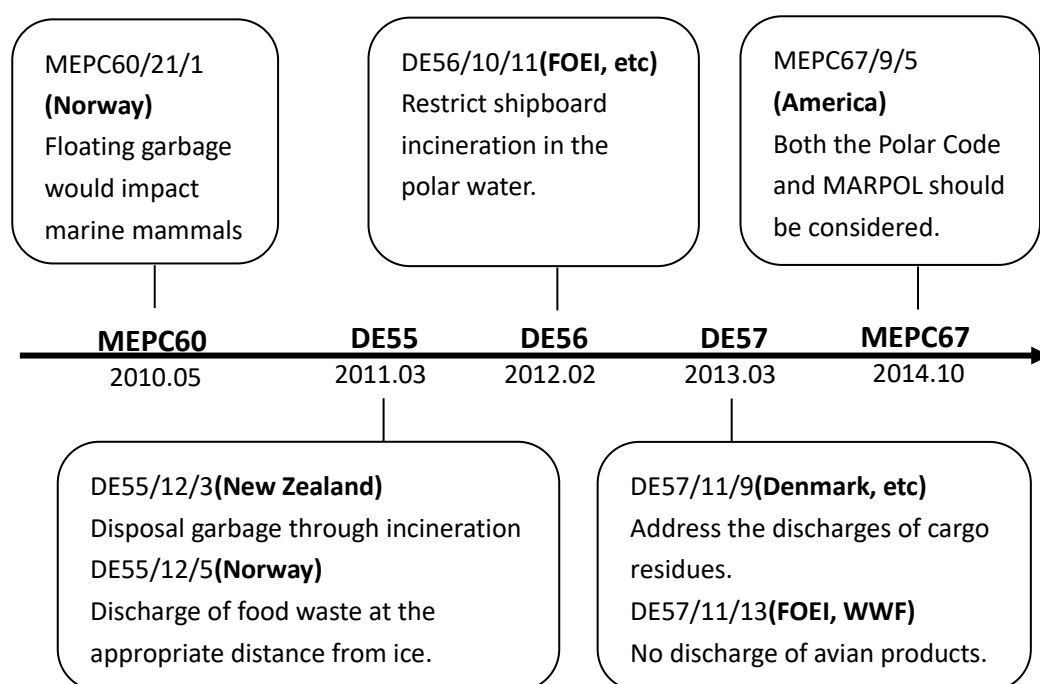


Figure 6.2 Timeline of relevant proposals on prevention of garbage pollution  
 Source: Compiled by the author based on relevant proposals

### 6.3 Chapter summary and suggestions

This chapter focuses on the interpretation and analysis of the specific regulations for prevention of pollution by garbage from ships.

First of all, the author interprets the specific regulations. This part mainly includes the additional operational requirements for Arctic waters and Antarctic area. The additional requirements for Arctic waters are mainly from the food waste, animal carcasses and cargo residues. And two special requirements are added for the Antarctic area.

Secondly, the author analyzes the prevention of garbage pollution in polar waters. Through the use of Fishbone Diagram to analyze the risk sources of garbage pollution, it is concluded that the Arctic waters is not belongs to special areas, the increased

additional risk sources are mainly from food waste, animal carcasses and cargo residues, due to the special nature of the polar waters. By comparing with MARPOL Annex V, it is found that the requirements for the Arctic waters are mainly added to the requirements for special area, based on the discharge requirements for non-special area. In addition, comparing with the discharge requirements for sewage, this part doesn't stipulate special requirements for the new category A and B ships and new passenger ships, as well as ships operating in the ice area for a long time. Through the statistical analysis of the proposals, the provision is mainly on put forward requirements for the Arctic to be equivalent to the special area, there had no much controversy.

Based on the above analysis, the author has the following suggestions:

- .1 it is suggested that the Arctic waters also designated as a special area, and based on the original requirements for special areas, additional measures to prevent the pollution by garbage from ships in polar waters can be put forward.
- .2 Restrict the garbage discharge of new category A and B ships and new passenger ships. It is suggested to restrict the distance, amount and rate of the discharges.
- .3 Restrictions may be relaxed for ships operating in areas of ice concentrations exceeding 1/10 for extended periods of time. Such as shorten the required discharge distance.

## CHAPTER 7

### OVERALL ANALYSIS AND RECOMMENDATIONS

#### 7.1 Overall analysis of pollution prevention measures and recommendations for amendments to the Polar Code

##### 7.1.1 Overall analysis of pollution prevention measures

In summary, the mandatory pollution prevention measures of the Polar Code are in the table 7.1:

Table 7.1 Summary of the mandatory pollution prevention measures in Polar Code

Chapter	Main content
<b>Chapter 1-prevention of pollution by oil</b>	1. Prohibit discharge 2. Provide the structural requirements which are not included in MARPOL Convention.
<b>Chapter 2-control of pollution by noxious liquid substances in bulk</b>	1. Prohibit discharge 2. Carriage of NLS identified as ship type 3, shall be subject to the approval of the Administration.
<b>Chapter 4-prevention of pollution by sewage from ships</b>	1. Discharge should be away from ice concentrated areas. 2. Prohibit discharge to new category A and B ships and new passenger ships. 3. "Relax" the discharge requirement to ships operated in ice concentrated areas for extended periods of time.
<b>Chapter 5-prevention of pollution by garbage from ships</b>	1. The discharge requirements for Arctic waters and special areas are almost the same. 2. Discharge should be away from ice concentrated areas.

Source: Compiled by the author based on the Polar Code

As can be seen from the above table, in general, the mandatory pollution prevention measures of Polar Code mainly refer to the measures of special areas in MARPOL

Convention. Besides, taking into account the special environment of polar areas, the Polar Code increases the corresponding structure and discharge requirements.

In contrast, according to the nature of the pollutants and the degree of harm, the chapter 1 and chapter 2 of Polar Code mainly take the zero discharge measures. Therefore, the future developments of them are expected to mainly focus on measures to prevent accidental leakage. The chapter 4 and chapter 5 mainly restrict the discharge distance, so operational requirements in polar areas are expected to remain the focus of them in the future.

In addition, the requirements for the control of ships' ballast water and biofouling in the Polar Code are not discussed in this thesis, with the increase of polar shipping and the increasing attention to the polar environmental protection, it is expected that these two parts may also move towards to mandatory requirements.

In fact, based on MARPOL Convention, the additional pollution prevention measures from Polar Code are limited in content and scope. As a result, some environmental organizations expressed their disappointments to the required limited measures, although they affirmed the introduction of such a compulsory Code in polar waters. In summary, their disappointments have several aspects in the following table 7.2.



Table 7.2 Summary of the other aspects concerned by environmental organizations

Aspects	Introduction
<b>Heavy fuel oil</b>	The discharge restriction of heavy fuel oil has always been a hot issue in polar shipping. The mandatory restriction to the Arctic waters has not been implemented because of political and other factors.(IMO, 2013g) In the last two years, America, Canada and the European Union have taken the lead in making commitments on the discharge restriction.
<b>Black carbon</b>	Black carbon can easily lead to ice melting, accelerating global warming. It has been widely discussed and established the definition at the MEPC 68, followed by voluntary study on data collection and measurement. (IMO, 2015c) It is foreseeable that this part will also be the focus of the next amendment of the Polar Code.
<b>Grey water</b>	After the adoption of Polar Code, FOEI and other environmental organizations pointed out in the information document MEPC68/INF.37 (IMO, 2015b) that the discharge of grey water from in polar waters has not yet been paid enough attention.
<b>Emergency response</b>	As early as the DE54, New Zealand proposed that the polar areas are difficult to provide effective emergency response due to the limitations of remote, weather and ice conditions. (IMO, 2010d)

Source: Compiled by the author based on the relevant proposals

Considering the increasing awareness of environmental protection, the author believes that these areas will also be the main directions of the future development of the pollution prevention measures of Polar Code.

### 7.1.2 Proposals for amendments to the provisions of the Polar Code

Based on the preceding discussion, I think that the following regulations can be amended.

Table 7.3 Summary of the suggested amendments to the Polar Code

Clauses	Amendments
<p><b>Chapter 1, para.1.1.4;</b> <b>Chapter 2, para. 2.1.2</b></p>	<p>Problem: Both of the two paragraphs have the requirement "as appropriate". As a compulsory clause, it is too vague to specifically operate.</p> <p>Recommended amendment: Replace as "Record books, manuals and pollution emergency plans should include the contents of polar waters."</p>
<p><b>Chapter 1, para. 1.2</b></p>	<p>Problem: The Polar Code do not have more stringent control over the large amount of oil spills that may cause more serious consequences, and the fragile natural and ecological environment of the polar waters requires such stringent control.</p> <p>Recommended amendment: Referring to the existing provisions of the MARPOL Convention, the amendments are as follows: .1 Further restrict the size and arrangement of cargo tanks .2Further restrict the total capacity of tanks and the capacity of individual tanks for oil residues. .3Further restrict the capacity of individual oil fuel tanks.</p>
<p><b>Chapter 2, para. 2.1.3</b></p>	<p>Problem: "should be subject to the approval of the Administration" means that the standard depends on different administrations. There is no uniform standard, and the different implementations of the flag states are not conducive to create a fair shipping atmosphere.</p> <p>Recommended amendment: Introducing an objective standard.</p>
<p><b>Chapter 3</b></p>	<p>Problem: Isolation is the most effective way to prevent the pollution by harmful substances carried by sea in packaged form. On the one hand, the packaging substances should be prevented from falling into the sea, on the other hand, the packaging substances fallen into the sea should be prevented from leakage.</p> <p>Recommended amendment: .1 Consider the adequacy of lashing requirements in polar low-temperature waters. .2 Require the soaking time in ice water of the packaging substances to prevent the pollution.</p>
<p><b>Chapter 4, para. 4.2.2</b></p>	<p>Problem: There is a situation that when the ship's sewage treatment plant fails, the ship cannot legally discharge sewage.</p> <p>Recommended amendment: Prior to the sufficient sewage reception facilities be equipped in the polar waters, it is suggested that this kind of discharge could be permitted under the condition of increasing discharge distance.</p>

<b>Chapter 4, para. 4.2.3</b>	Problem: The requirement “for extended periods of time” is too vague to specifically operate.
	Recommended amendment: Replace it with “for more than 30 days”, which was referring to the regulation 1.1.3
<b>Chapter 5</b>	Problem 1: Through comparative analysis above, it can be seen that the discharge requirements of garbage are almost no difference between the Antarctic area and Arctic waters. In addition, these requirements cover the requirements in special areas.
	Problem 2: Comparing to the oil and NLS, the sewage and garbage have the similar extent of pollution. Chapter 4 provides special requirements for the new category A and B ships, and the new passenger ships and the ships operating in ice areas for extended periods of time. The Chapter 5 should also have corresponding requirements for garbage.
	Recommended amendment 1 : it is suggested that the Arctic waters designated as a special area, and based on the original requirements, additional measures to prevent the pollution by garbage from ships in polar waters can be put forward. Recommended amendment 2 : Restrict the garbage discharge of new category A and B ships and new passenger ships. It is suggested to restrict the distance, amount and rate of the discharges. In addition, relax the restrictions of garbage discharge (such as the discharge distance) to ships operating in areas of ice concentrations exceeding 1/10 for extended periods of time.

Source: Compiled by the author

These amendments will be presented in the appendix A in the form of a proposal for more specific.

## **7.2 Overall statistical analysis of proposals and recommendations to stakeholders**

### **7.2.1 Statistical analysis of the total number of proposals**

In order to understand the concerns of countries and organizations intuitively, the author makes a statistical analysis of the proposals for the formulation of specific pollution prevention measures in the Polar Code, and the proposals quantities for

participation by different submitters are shown in the Figure 7.1.

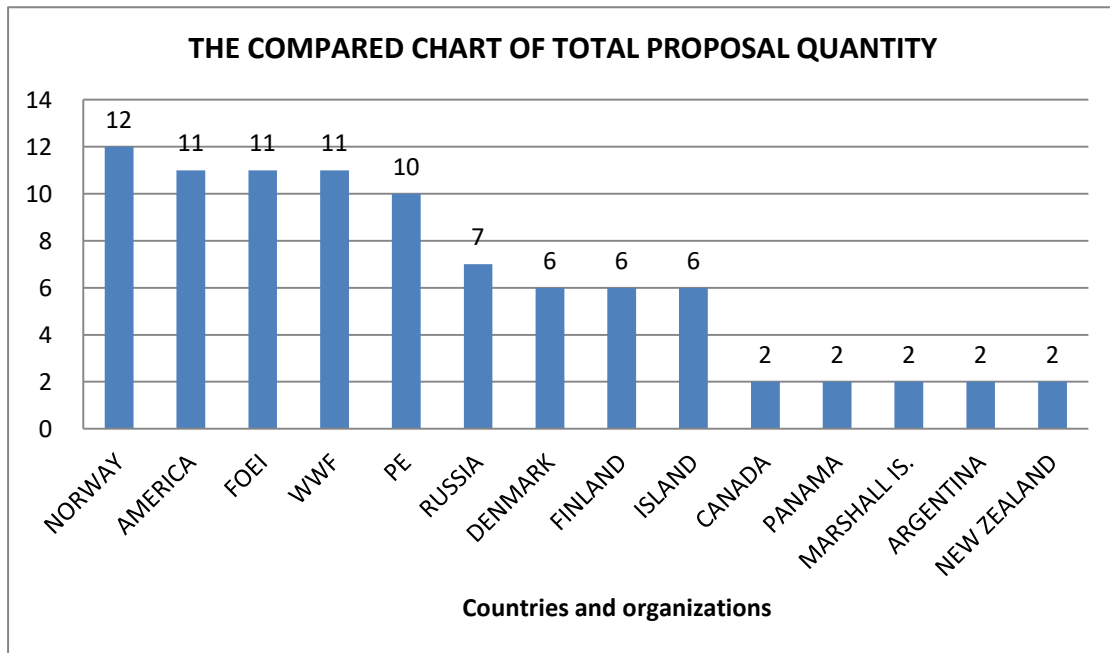


Figure 7.1 The compared chart of total proposal quantity<sup>2</sup>

Source: Compiled by the author

(Note: In order to reflect the submitters' attention, in this section, the co-proposals are repeatedly counted according to the submitters.)

Due to the large number of participating countries and organizations, the table mainly counts the number of proposals for countries participating in more than two proposals. As can be clearly seen from the figure, a total of 90 proposals, eight countries of the Arctic Council and other environmental organizations involved in 82, accounting for the majority of the proposal (91%), the rest are mainly New Zealand and other Antarctic countries, as well as Panama and other Flag States.

Since the previous Antarctic area is the special area of multiple MARPOL Annexes (Annexes I, II, V), more stringent pollution prevention measures have been taken. Therefore, it is not difficult to see from the pollution prevention measures in the Polar Code, apart from the uniform provisions for the polar waters in Chapter 4 of the Part II-A, the other chapters mainly propose additional provisions to the Arctic waters.

<sup>2</sup> More information can refer to Appendix B.

Arctic Council and FOEI and other environmental organizations are stakeholders to the pollution prevention in Arctic waters, previously made systematic studies and introduced relevant recommended guidelines, are the main "driving force" to develop the pollution prevention measures in Polar Code. Based on their long-term researches and practical experiences, it is foreseeable that they will play a leading role in the future amendments of pollution prevention measures in Polar Code.

In addition, the figure shows that the participations of other countries are very few. However, with the improvement of the navigation environment of the Arctic waters, there will be more and more ships to navigate in the future. At that time, it is believed that more and more channel users will also draw their own concerns on the basis of existing experience.

### **7.2.2 Statistical analysis on the proposals of different stakeholders in different aspects**

To further clarify the concerns of the parties and to predict the future direction of pollution prevention measures, the author statistics all the recommended and commented proposals on pollution prevention measures of different pollution sources, those proposals were submitted by different countries or organizations on different meetings in International Maritime Organization (IMO).

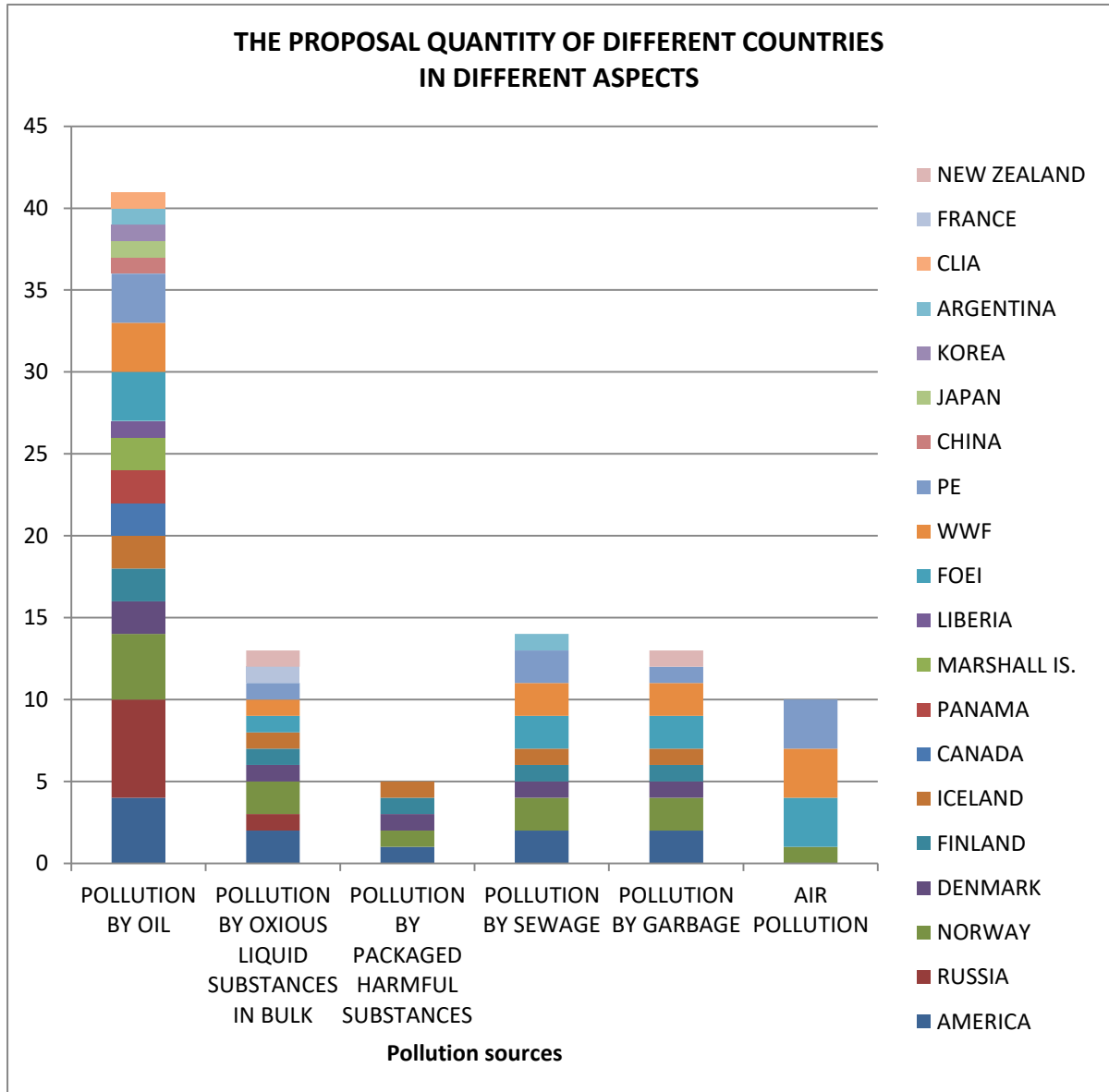


Figure 7.2 The proposal quantity of different stakeholders in different aspects  
Source: Compiled by the author

The Figure 7.2 has counted 96 proposals, and six pollution sources in the abscissa are in accordance with the six Annexes of MARPOL Convention to classify, the pollution prevention measures of Polar Code are the additional requirements on the basis of the six Annexes.

First of all, it is obvious that the prevention of oil pollution is the focus of attention, a total of 41 proposals, accounting for 42.7% of the total 96 proposals, and it is the

largest part of discussion and controversy. In addition, 18 countries or organizations participated in this part, and it is also the largest number of participants in all parts. It reflects there are a large number of stakeholders, and it can be foreseen that, this part will still be the focus of attention in the future amendments. In addition, it was noted that some countries or organizations made different proposals in terms of pollution by packaging harmful substances and air, which were not written into the Polar Code. It is possible to include these two parts in the Polar Code in the future.

Specific proposals to different parts, Russia had 6 proposals in preventing oil pollution, which was the largest number in all parties, reflecting its attention as the world's largest oil producer. In addition, it cannot be ignored that the driving force from environmental organizations in all parts, especially for air pollution, 9 proposals in 10 were from environmental organizations. Apart from that, the figure shows the participation of some other shipbuilding and shipping countries such as China. With the rise of polar shipping, more stakeholders are expected to take part in the future amendments of the Polar Code.

In addition, it is worth mentioning that there are a few proposals involving ballast water, biofouling management requirements and other matters. Although these proposals were not involved in this statistics, their requirements are also possible to be mandatory ones in the future, so all parties should keep actively concern on them.

### **7.2.3 Recommendations to the Stakeholders**

Based on the analysis above and current hot issues, the author will provides some recommendations to the stakeholders involved in pollution prevention measures of Polar Code.

### **7.2.3.1 Arctic Council and Environmental Organizations**

Arctic Council member countries and environmental organizations have played a major role in promoting the development of pollution prevention measures of Polar Code, which is commendable. In addition, I have the following further suggestions:

- .1 Recommend the Arctic Council member countries and environmental organizations to actively explore the feasibility of implementing environmental protection measures. We have seen that, the United States, Canada and the European Union and other countries have begun to try in the prohibition of heavy fuel and other higher pollution prevention requirements, which reflects the responsible attitude of developed countries. It is advisable to accumulate the experience in the process of the trial and propose feasible solutions or alternative measures for the difficulties raised by the parties. Such as the environmental organization FOEI and others recently put forward the alternative to heavy fuel oil.
- .2 In practical operations, it is advisable to promote reasonable and feasible pollution prevention measures through technology transfer and co-operation, for example, Canada's system to ensure zero discharge of oil.
- .3 It is recommended to actively communicate with all parties before the corresponding environmental measures are put forward, so that the measures can be widely accepted and adopted quickly.

### **7.2.3.2 Channel users**

The rise of polar shipping has shortened the sailing distance of ships, saved voyage



time and fuel, and improved the economic benefits of the countries which use the channel. On the other hand, it also posed a potential threat to the environment. Therefore, Channel users are obliged to actively participate in the amendments of pollution prevention measures of the Polar Code. In this regard, the author has the following suggestions:

- .1 They should actively participate in the international research activities, and express their own concerns. Active participation and communication can improve the formulated efficiency of the corresponding pollution prevention measures, but also effectively protect their own interest.
- .2 Trying to improve their technology levels of pollution prevention. Only by actively upgrading the "hardware" levels, they cannot be in a passive position in the future development of the Polar Code.

### **7.2.3.3 Shipbuilding countries**

Compared with the ordinary waters, the frozen navigation environment of the polar waters requires more stringent structural requirements for ships. Specific to the pollution prevention measures of Polar Code, it mainly has the relation with the chapter 1 “prevention of pollution by oil” and Chapter 2 “control of pollution by noxious liquid substances in bulk”. The serious harm to the ecological environment of the polar water, the polar frozen navigation environment and the lack of emergency response, make the strengthening of the ship structure become the direction of the development of the pollution prevention measures of Polar Code. For the shipbuilding countries, I have the following suggestions:

- .1 Actively participates in technical cooperation. They should carry out research on structure and equipment in advance, to prepare for more stringent pollution

prevention requirements.

.2 Remove technical barrier to achieve win-win. Throughout the formulation of maritime Conventions, technical barrier is one of the main obstacles of the acceptance of the Conventions. Shipbuilding countries should increase the popularity of technology, using a variety of ways to carry out technological transformation and cooperation, so as to achieve the win-win situation.

#### **7.2.3.4 Port States and Coastal States**

In addition, to the Port States, it is recommended that these countries should deepen cooperation and harmonize the Port State Control (PSC) standards to ships operated in polar waters. To the Coastal States, there are mainly Canada and Russia in the polar waters, how to further integrate and develop their domestic legislations and Polar Code is the problem which needs to be solved at this stage. According to the actual situation, it is suggested that the pollution prevention measures of the Polar Code should be effectively connected and supplemented with their domestic legislations.

## **CHAPTER 8**

### **CONCLUSION**

To sum up, this thesis mainly completes three aspects, namely, the interpretations, analyses and suggestions of the pollution prevention measures in Polar Code.

#### **Interpretation**

Through consulting the conference documents and the reports, the author concludes and interprets the formulation process of each specific provision of the pollution prevention measures in Polar Code. There are mainly in the following aspects: 1. The background and purpose of the provisions. 2. Changes of the provisions. 3. The impact of the provisions. 4. Concerns of Stakeholders. 5. Controversies. Through the interpretation of the above aspects, it can basically reflect the overall situation of the provisions.

#### **Analysis**

In the aspect of analysis, the author mainly uses the timeline analysis, Fishbone Diagram analysis, comparative analysis and statistical analysis and so on. On the whole, the main results are as follows: 1. Found out the risk sources of different pollutions and analyzed the rationality and adequacy of the overall measures and predicted the development direction of measures. 2. Compared the additional requirements of the Polar Code to the MARPOL Convention, analyzed their

rationality and adequacy. 3. Analyzed the rationality of the existing measures by comparing the links and differences between different pollutions and the corresponding measures. 4. Identified the participation of different stakeholders on different measures and provided a reference for further revision.

## **Suggestions**

In terms of suggestions, there are two main aspects in this thesis: 1. Proposed amendments to the specific provisions of the pollution prevention measures. 2. Provided response suggestions to the various stakeholders.

## **Findings**

Through the interpretation and analysis of pollution prevention measures in the Polar Code, the author supposes that it is not yet mature, and there are still rooms for development.

First, the content is not enough. The specific performances are as follows: 1. lack of pertinence. Most provisions are only set to be equivalent to the requirements for special areas in MARPOL Convention, and the specific "special" requirements of the polar areas are not much. 2. Lack of systematicness. The Goal-Based Standards is a good attempt, but not enough. Most provisions are formulated by different individual proposals, so some parts are inevitable to be omitted. Such as the "consistency" issue which was repeatedly mentioned in proposals. It is proposed to fully analyze the linkages and differences between different pollutants, and construct a systematic framework. 3. Lack of mandatory requirements for pollution prevention measures which are outside of the MARPOL Convention. In addition, many vague statements appeared in the provisions are likely to weaken the validity of the Code.

Second, the participations of stakeholders are not enough. Performances are as

follows: 1. Proposals' quantity is small. The amount of proposals is insufficient except which about oil pollution. 2. National participation is not high, basically concentrated in the Arctic Council countries, it is difficult to reflect the concerns and interests of all parties. To a certain extent, the inadequate participation also leads to insufficient content.

### **Limitations**

The author didn't involve in specific formulation of the measures, and the conclusions and perspectives in this thesis are based on the study of existing documents, reports and literatures. They are the main limitations. In the next step, the author will focuses on the feasibility of those suggestions.

It is believed that with the rise of polar shipping, there will be a growing number of stakeholders involved, through the accumulation of a large number of practical experiences, they will put forward more feasible pollution prevention measures to the Polar Code to make it more comprehensive, specific and perfect.

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## APPENDIX A:

### A draft proposal

MARINE ENVIRONMENT PROTECTION  
COMMITTEE  
71th session  
Agenda item 3

MEPC 71/3/\*  
15 June 2017  
Original: ENGLISH

### CONSIDERATION AND ADOPTION OF AMENDMENTS TO MANDATORY INSTRUMENTS

#### Draft Amendments to the pollution prevention measures (PART II) in the Polar Code

Submitted by XXX

#### SUMMARY

*Executive summary:* This document reviews the background of the Polar Code, based on the existing provisions and analysis, proposes some amendments to the pollution prevention measures for Polar Code.

*Strategic direction:* 7.1, 7.2

*High-level action:* 7.1.2, 7.2.1

*Planned output:*

*Action to be taken:* Paragraph 20

*Related documents:* MEPC 60/20/1, DE54/13/7, DE54/INF.5, ISWG PC/1, MEPC66/21, DE55/12/5, DE56/10/1, SDC1/3, MEPC67/9, MEPC68/6/4, SDC1/WP.4, MEPC67/WP.8, MEPC67/WP.14, MEPC 66/21, MEPC 66/WP.6, DE57/11/9

## **Background**

1 MEPC 68 adopted, by resolution MEPC.264 (68), the International Code for Ships Operating in Polar Waters (Polar Code) that had entered into force on 1 January 2017. It has taken years of hard work to develop a document covering all the aspects of marine safety and marine environment protection in the Arctic region. Realistic and well-balanced approach was demonstrated in the introduction and further implementation of strict standards of shipping.

2 To the specific pollution prevention measures in Polar Code, it mainly provides the corresponding requirements from prevention of oil, NLS, sewage and garbage pollution from ships.

## **Discussion and analysis**

3 By analyzing the specific provisions and related proposals, the sponsor believes that some measures have yet to be further refined. In accordance with the different chapters of the pollution prevention measures, the rationality and problems of the specific provisions are analyzed below and the proposed amendments are made. The Sponsor divides the suggestions into three parts: the provisions need to be amended, the provisions suggested to be amended, and the areas suggested to be researched.

### **Chapter 1-prevention of pollution by oil**

4 In the case of Regulation 1.1.4 & 2.1.2, the requirement "operation in polar waters shall be taken into account, as appropriate". As a compulsory clause, the word "appropriate" in which is too vague to specifically operate. It can be replaced by the following: "Record books, manuals and pollution emergency plans should include the contents of polar waters." Besides, it can be foreseen that control measures for accidental oil spill will be the development direction of preventing pollution by oil and noxious liquid substances in bulk. Considering the feasibility, this regulation needs to be amended.

5 With regard to Regulation 1.2, currently, the structural requirements for prevention of pollution by oil in Polar Code mainly aim at preventing the small amount of oil spill, which has not been specified in the MARPOL Convention. Such as: paragraph 1.2.1, oil fuel tanks with an aggregate oil fuel capacity of less than 600  $m^3$ ; paragraph 1.2.2, cargo tanks of ships other than oil tankers; paragraph 1.2.3, add the oil tankers of less than 600 DWT (600-5000 DWT has been stipulated in MARPOL); para. 1.2.4, oil residue tanks. However, the Polar Code do not have more stringent control over the large amount of oil spills that may cause more serious consequences, and the fragile natural and ecological environment of the polar waters

requires such stringent control.

6 Referring to the existing provisions of the MARPOL Convention, the amendments are as follows:

- .1 Further restrict the size and arrangement of cargo tanks
- .2 Further restrict the total capacity of tanks and the capacity of individual tanks for oil residues.
- .3 Further restrict the capacity of individual oil fuel tanks.

7 It should be noted that, it is more difficult to implement the additional structural requirements than to implement the additional operational requirements, involving the shipyards' and shipping company's interests, therefore, this regulation suggested to be amended, it should be adopted step by step.

### **Chapter 2-prevention of pollution by NLS**

8 In case of Regulation 2.1.3,"should be subject to the approval of the Administration" means that the standard depends on different administrations. There is no uniform standard, and the different implementations of the flag states are not conducive to create a fair shipping atmosphere. And then it would also weaken the mandatory of Polar Code. Therefore, it is suggested that an objective standard should be introduced. For example, the specific separation requirements in the additional guidance chapter 2 could be mandatory. This regulation is suggested to be amended.

9 In addition, it is recommended that Chapters 1 and 2 should introduce emergency equipment and operational requirements to cope with the harsh environment and inefficient emergency response in the polar waters.

### **Chapter 3-prevention of pollution by harmful substances in packaged form**

10 Isolation is the most effective way to prevent the pollution by harmful substances carried by sea in packaged form. On the one hand, the packaging substances should be prevented from falling into the sea, on the other hand, the packaging substances fallen into the sea should be prevented from leakage. Considering the relevant research and coordination are inadequate, the following two points are suggested to be amended .1 Considering the adequacy of lashing requirements in polar low-temperature waters. .2 Require the soaking time in ice water of the packaging substances to prevent the pollution.

### **Chapter 4-prevention of pollution by sewage**

11 In case of Regulation 4.2.2, there is a problem that when the ship's sewage treatment plant fails, the ship cannot legally discharge sewage.Unlike oil pollution, ships, especially passenger ships, produce large amounts of sewage every day.

Referring to the requirement of special area, adequate reception facilities can be an alternative. Considering the necessity to solve this problem, it needs to be amended.

12 The paragraph 4.2.2 can be replaced as following: Discharge of sewage into the sea is prohibited from new category A and B ships and new passenger ships, except when such discharges are in compliance with the paragraph 4.2.1.3. If this condition cannot be satisfied, these ships should discharge comminuted and disinfected sewage at a distance of more than 12 nm from any ice-shelf or fast ice, and discharge sewage that is not comminuted or disinfected at a distance of more than 24 nm from any ice-shelf or fast ice.

13 In addition, with regard to regulation 4.2.3, the sentence “for extended periods of time”, although the MEPC67 working group interpret it that it should consider the ship size, the number of passengers and the ship operations, the author believes that a united period(such as 30 days) would be more suitable, as a mandatory Code. Otherwise, it may be detrimental to the interest of coastal countries, for example, Canada expresses its concern in the DE57, and it is possible to refer to regulation 1.1.3. So it needs to be amended.

#### **Chapter 5-prevention of pollution by garbage**

14 Through comparative analysis above, it can be seen that the discharge requirements of garbage are almost no difference between the Antarctic area and Arctic waters. In addition, these requirements cover the requirements in special areas. The current additional requirements in Polar Code are not beneficial to understand and implement. It is suggested that the Arctic waters designated as a special area, and based on the original requirements, additional measures to prevent the pollution by garbage from ships in polar waters can be put forward. Considering the requirements in Polar Code for garbage discharge in Arctic are almost the same as Antarctic, so it needs to be amended.

15 Comparing to the oil and NLS, the sewage and garbage have the similar extent of pollution. Chapter 4 provides no sewage discharge requirements for the new category A and B ships, and the new passenger ships. In addition, the Chapter 4 “relaxes” the requirements for the ships operating in ice areas for extended periods of time. The Chapter 5 should also have corresponding requirements for garbage. It is suggested to restrict the distance, amount and rate of the discharges. In addition, relax the restrictions of garbage discharge (such as the discharge distance) to ships operating in areas of ice concentrations exceeding 1/10 for extended periods of time. This amendment also is needed.

#### **Some other matters**

16 Considering the similar serious damaged extent to the seawater, the structure



requirements would be a development direction for the prevention of pollution by these two pollutants. So further measures may as follows:

- .1 It is suggested to establish a comprehensive emergency response mechanism to prevent accidental spills.
- .2 It is suggested that accidental spills by NLS can be further prevented by improving structural requirements.

17 Considering the similar properties and damaged extent of the Sewage and Garbage from ships, It is suggested that all parties should continue to study on the operational requirements for the prevention of pollution by sewage and garbage from ships.

18 From a statistic by the sponsor, the countries outside from the polar waters seldom took part in the formulation of Polar Code, without all parties' participation, it would be detrimental to the development of these countries and Polar Code. It is suggested that the non-Arctic Council countries should actively take part into the revision of the measures in the future.

### **Proposal**

19 The Sponsor divides the suggestions above into three parts: the provisions need to be amended, the provisions suggested to be amended, and the areas suggested to be researched. The provisions need to be amended include Regulation 1.1.4, 2.1.2, 4.2.2, 4.2.3 and Chapter 5 (They are wrote in the Annex).The provisions suggested to be amended are Regulation 1.2, Part II-B 1.1, 2.1.3 and Chapter 3. The areas suggested to be researched are Oil & NLS, Sewage& Garbage and Stakeholders.

### **Action Requested of the Committee**

20 The Committee is invited to consider the proposal in paragraph 19 and take action as appropriate.

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## ANNEX

### DRAFT AMENDMENTS TO POLAR CODE PART II

The sponsor would like to propose modifications to the following regulations of Polar Code, in which new text is underlined and deletions are shown as strike through:

#### Chapter 1

~~“1.1.4 Operation in polar waters shall be taken into account, as appropriate, in the Oil Record Books, manuals and the shipboard oil pollution emergency plan or the shipboard marine pollution emergency plan as required by MARPOL Annex I.”~~

It could be replaced by:

“1.1.4 The contents of polar waters should be included in the Oil Record Books, manuals and the shipboard oil pollution emergency plan or the shipboard marine pollution emergency plan as required by MARPOL Annex I.”

#### Chapter 2

~~“2.1.2 Operation in polar waters shall be taken into account, as appropriate, in the Cargo Record Book, the Manual and the shipboard marine pollution emergency plan for noxious liquid substances or the shipboard marine pollution emergency plan as required by MARPOL Annex II.”~~

It could be replaced by:

“2.1.2 The contents of polar waters should be included in the Cargo Record Book, the Manual and the shipboard marine pollution emergency plan for noxious liquid substances or the shipboard marine pollution emergency plan as required by MARPOL Annex II.”

#### Chapter 4

“4.2.2 Discharge of sewage into the sea is prohibited from category A and B ships constructed on or after 1 January 2017 and all passenger ships constructed on or after 1 January 2017, except when such discharges are in compliance with paragraph 4.2.1.3 of this chapter. ”

It could be replaced by:

“4.2.2 Discharge of sewage into the sea is prohibited from new category A and B ships and new passenger ships, except when such discharges are in compliance with the paragraph 4.2.1.3. If this condition cannot be satisfied, these ships should discharge comminuted and disinfected sewage at a distance of more than 12 nm from any ice-shelf or fast ice, and discharge sewage that is not comminuted or disinfected at a distance of more than 24 nm from any ice-shelf or fast ice.”

“4.2.3 Notwithstanding the requirements of paragraph 4.2.1, category A and B ships that operate in areas of ice concentrations exceeding 1/10 for ~~extended periods of time~~, may only discharge sewage using an approved sewage treatment plant certified by the Administration to meet the operational requirements in either regulation 9.1.1 or 9.2.1 of MARPOL Annex IV. Such discharges shall be subject to the approval by the Administration.”

It could be replaced by:

“4.2.3 Notwithstanding the requirements of paragraph 4.2.1, category A and B ships that operate in areas of ice concentrations exceeding 1/10 for more than 30 days, may only discharge sewage using an approved sewage treatment plant certified by the Administration to meet the operational requirements in either regulation 9.1.1 or 9.2.1 of MARPOL Annex IV. Such discharges shall be subject to the approval by the Administration.”

## **Chapter 5**

### **Amendment 1:**

it is suggested that the Arctic waters designated as a special area, and based on the original requirements, additional measures to prevent the pollution by garbage from ships in polar waters can be put forward.

### **Amendment 2:**

Restrict the garbage discharge of new category A and B ships and new passenger ships. It is suggested to restrict the distance, amount and rate of the discharges. In addition, relax the restrictions of garbage discharge (such as the discharge distance) to ships operating in areas of ice concentrations exceeding 1/10 for extended periods of time.

## APPENDIX B:

### The proposals which directly suggest or comment on the formulation of specific provisions for pollution prevention measures

SESSION	NO.	PROPOSALS	SUBMITTERS
<b>MEPC60</b>	MEPC60/21/1		
<b>DE55</b>	DE55/12/3	Environmental considerations for the development of the Polar Code	New Zealand
	DE55/12/5	Draft proposal for a environmental protection chapter for inclusion in the Polar Code	Norway
	DE55/12/13	Proposal for inclusion of a chapter on environmental protection in the mandatory code	France
	DE55/12/16	Harmful substances in packaged form and containers in Arctic waters	FOEI, IFAW, WWF and Pacific International
	DE55/12/18	Reducing black carbon emissions from vessels in the Polar Regions	FOEI, CSC, IFAW, WWF PE
	DE55/12/19	Definition of pollutant	(FOEI, IFAW, WWF and PE
	DE55/12/20	Sewage and sewage-related discharges in polar regions	FOEI, IFAW, WWF and PE
<b>DE56</b>	DE56/10/10	Heavy fuel oil use in Arctic waters	FOEI, CSC, IFAW, WWF PE
	DE56/10/11	Incineration in polar waters	FOEI, CSC, IFAW, WWF PE
	DE56/10/12	Environmental protection chapter	FOEI, IFAW, WWF and PE
	DE56/10/13	Reducing the environmental impacts of hull coating and anti-fouling systems when undertaking polar operations	WWF, FOEI and Pacific Environment
	DE56/INF.3	Workshop on Environmental Aspects of the Polar Code	Secretariat
<b>DE57</b>	DE57/11/9	Proposals related to an environmental chapter of a mandatory Code for ships operating in polar waters (Polar Code)	Denmark, Finland, Iceland, Norway and the US
	DE57/11/11	Heavy fuel oil use by vessels in Arctic waters	FOEI, CSC, IFAW, WWF and Pacific Environment
	DE57/11/12	Proposals related to an environmental chapter of a mandatory Code for ships operating in polar waters (Polar Code)	Russian Federation
	DE57/11/13	Proposals related to an environmental chapter of a mandatory Code for ships operating in polar waters (Polar Code)	FOEI and WWF
	DE57/11/14	Measures to prevent pollution of polar waters by sewage and grey water	FOEI, WWF and PE
	DE57/11/18	Comments to proposals related to an environmental chapter of a mandatory Code for ships operating in polar waters (Polar Code)	Canada, Denmark and Norway
	DE57/11/20	Inclusion of a black carbon regulation as part of the mandatory Code for ships operating in polar waters	CSC, FOEI, WWF and Pacific Environment
	DE57/11/23	Operational oil pollution in Polar waters	FOEI, WWF and PE
<b>ISWG PC</b>	ISWG PC/4	Polar Water Operational Manual, voyage planning and contingency	the United States

		planning	
<b>SDC1</b>	SDC1/3/1	Reception facilities for oil and oily mixtures	Panama, Marshall Is, et al.
	SDC1/3/18	Comments on chapter 1 of part II-A	Russian Federation
	SDC1/3/23	Reception facilities for oil and oily mixtures	FOEI, WWF and PE
	SDC1/3/19	Part II-A - Applicability and goal-based standards	United States
<b>MEPC66</b>	MEPC66/11/3	Comments on the outcome of SDC 1 Environmental issues related to the draft Code for ships operating in polar waters	Russian Federation
	MEPC66/11/5	Development of a mandatory code for ships operating in polar waters	Netherlands and Panama
	MEPC66/11/6	Proposal for amendments to section 3.3 of Part II-B of the draft International Code for Ships Operating in Polar Waters (Polar Code)	Finland
	MEPC66/11/8	Development of a mandatory code for ships operating in polar waters - reception facilities for oil and oily mixtures	Canada
	MEPC66/11/10	Comments on the outcome of SDC 1 - Draft Polar Code	Germany
	MEPC66/11/12	General applicability of Part II-A of the Polar Code	United States
	MEPC66/11/13	Use of goal-based standards in part II-A of the Polar Code	United States
	MEPC66/11/14	Polar Code incorporation into MARPOL	United States
	MEPC66/11/15	Polar Code incorporation into MARPOL Annex I	United States
	MEPC66/11/16	Polar Code incorporation into MARPOL Annex II	United States
	MEPC66/11/17	Polar Code incorporation into MARPOL Annex IV	United States
	MEPC66/11/18	Polar Code incorporation into MARPOL Annex V	United States
<b>MEPC67</b>	MEPC67/9/2	Comments on the environmental matters in the Polar Code (Part II-A, chapter 1)	Russian Federation
	MEPC67/9/3	Comments on the Report of the Polar Code Correspondence Group (part II-A, chapter 1)	Russian Federation
	MEPC67/9/4	Comments on the Report of the Polar Code Correspondence Group (part II-A, chapter 1)	Russian Federation
	MEPC67/9/5	Legal and technical comments on Polar Code, part II and amendments to MARPOL	United States
	MEPC67/9/6	Certification in part II-A of the Polar Code	United States
	MEPC67/9/7	Comments on the Report of the Polar Code Correspondence Group	ICS and CLIA
	MEPC67/9/8	Comments on the Report of the Polar Code Correspondence Group	Iceland, Japan, Marshall Is, Panama and the CLIA
	MEPC67/9/9	Environmental protection in the Polar Code	FOEI, WWF, PE
	MEPC67/9/10	Comments on the report of the correspondence group	Argentina
	MEPC67/9/11	Reduction of administrative burden	Canada, Liberia and Marshall Islands
<b>MEPC68</b>	MEPC68/6	Draft amendments to MARPOL Annexes I, II, IV and V to make use of environment-related provisions of the Polar Code mandatory	the Secretariat
	MEPC68/6/1	Draft amendments to regulation 12 of MARPOL Annex I	Secretariat
	MEPC68/6/4	Proposed modifications to regulation 1.2.2 of chapter 1 of draft Polar Code, part II-A	China and Republic of Korea

Source: Compiled by the author based on relevant proposals