

World Maritime University

The Maritime Commons: Digital Repository of the World Maritime University

World Maritime University Dissertations

Dissertations

11-5-2017

Assessment of Vietnam's capacity and commitment to ratify and implement the International Convention on Oil Pollution Preparedness, Response and Co-Operation (OPRC), 1990

Hieu Huu Dao

Follow this and additional works at: https://commons.wmu.se/all_dissertations



Part of the [Emergency and Disaster Management Commons](#), and the [Oil, Gas, and Energy Commons](#)

Recommended Citation

Dao, Hieu Huu, "Assessment of Vietnam's capacity and commitment to ratify and implement the International Convention on Oil Pollution Preparedness, Response and Co-Operation (OPRC), 1990" (2017). *World Maritime University Dissertations*. 563.

https://commons.wmu.se/all_dissertations/563

This Dissertation is brought to you courtesy of Maritime Commons. Open Access items may be downloaded for non-commercial, fair use academic purposes. No items may be hosted on another server or web site without express written permission from the World Maritime University. For more information, please contact library@wmu.se.

WORLD MARITIME UNIVERSITY

Malmö, Sweden

**ASSESSMENT OF VIETNAM'S CAPACITY AND
COMMITMENT TO RATIFY AND IMPLEMENT
THE INTERNATIONAL CONVENTION ON OIL
POLLUTION PREPAREDNESS, RESPONSE
AND CO-OPERATION (OPRC), 1990.**

By

DAO HUU HIEU

Vietnam

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

MASTER OF SCIENCE

In

MARITIME AFFAIRS

**(OCEAN SUSTAINABILITY, GOVERNANCE AND
MANAGEMENT)**

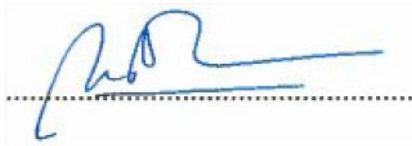
2017

DECLARATION

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

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

(Signature):



(Date):

18/09/2017

Supervised by:

**Professor Lawrence Hildebrand
World Maritime University**

Co-supervised by:

Dr. Jonas Pålsson

ACKNOWLEDGEMENT

First of all, I would like to thank my distinguished and esteemed supervisor, Professor Lawrence Hildebrand with kind guidance, valuable advice and various valuable resources, which helped me much not only to enhance my knowledge on the maritime file but also to do this dissertation during the studies at the World Maritime University.

I would also like to extend my sincere thanks to my co-supervisor, Dr. Jonas Pålsson, who enthusiastically supported and guided me throughout the research study.

I am especially indebted to the relevant officers and organizations in Vietnam's maritime industry that shared their knowledge, expertise and information.

I sincerely acknowledge the Norwegian Agency for Development Cooperation for providing me the valuable opportunity and financial support to study at the WMU and my organization, Vietnam Maritime Administration, for nominating me to apply for WMU's M.Sc. program in Maritime Affairs (Ocean Sustainability, Governance and Management).

I would like to express my gratefulness to all WMU staff as well as to all colleagues of the class, especially, Ms. Emma C. Metieh Glassco for her assistance.

Finally, I express my profound gratitude to my beloved parents for their unconditional support, ethical guidance and unbounded love. Furthermore, I would like to express my special thanks to my wife and my daughter for their encouragement and patience during my studies.

ABSTRACT

Title of Dissertation: **Assessment of Vietnam's Capacity and Commitment to Ratify and Implement the International Convention on Oil Pollution Preparedness, Response and Co-Operation (OPRC), 1990**

Degree: **M.Sc.**

The dissertation aims to assess Vietnam's capacity and commitment to ratify and implement the International Convention on Oil Pollution Preparedness, Response and Co-Operation (OPRC), 1990. The study is based on an evaluation of available data and information in the maritime field and the valuable knowledge of Vietnam's oil spill experts.

As a result of the development of the international shipping industry, as well as the rapid growth of Vietnam's economy, the risk of oil spill incidents is increasing nationally and internationally. Moreover, increasing maritime transportation of oil leads to accidental oil spills, which are unpredictable events that may cause serious negative environmental and socioeconomic impacts to affected countries. In response, the International Maritime Organization has adopted the OPRC Convention, entered into force on May 15, 1995. The purpose of the Convention is to minimize the consequences of oil pollution incidents, and to promote international cooperation and mutual assistance in coping with major oil pollution incidents.

Thus, Vietnam needs to review and assess its oil spill response capacity and to ratify and implement the OPRC Convention and other relevant regional cooperation arrangements to combat marine pollution. These actions will enhance Vietnam's protection of the marine environment.

Lastly, a proposed roadmap, with some recommendations are made to fulfill the provision of enforcement of the OPRC Convention in Vietnam.

KEYWORDS: Assessment, oil spill pollution, preparedness, response and cooperation, Vietnam.

TABLE OF CONTENTS

DECLARATION	ii
ACKNOWLEDGEMENT.....	iii
ABSTRACT.....	iv
TABLE OF CONTENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS	x
CHAPTER 1 - INTRODUCTION.....	1
1.1. Background	1
1.2. Objectives	6
1.3. Research Methodology	6
1.4. Scope and limitations of the study.....	7
1.5. Structure of the Dissertation.....	8
CHAPTER 2 - OVERVIEW OF OIL POLLUTION PREPAREDNESS, RESPONSE AND CO-OPERATION	9
2.1. Overview of the International Convention on Oil Pollution Preparedness, Response, and Co-Operation, 1990 (OPRC)	9
2.1.1. The purpose and benefits of the OPRC	9
2.1.2. The basic contents of OPRC	10
2.2. Introduction to Memorandum of Understanding on ASEAN Cooperation Mechanism for Joint Oil Spill Preparedness and Response	12
2.3. Overview on the implementation of oil pollution preparedness and response in Singapore and the Philippines	13
2.3.1. Oil pollution preparedness and response of the Philippines.....	14
2.3.2. Oil pollution preparedness and response of Singapore.....	16
2.4. The strengths of Singapore and the Philippines can be applied to Vietnam.....	18
CHAPTER 3 - OVERVIEW OF OIL SPILL PREPAREDNESS AND RESPONSE IN VIETNAM.....	19

3.1. The potential risks and impacts of oil spills on the marine environment and socio-economic conditions in Vietnam	19
3.2. The current status of oil spill preparedness and response in Vietnam	23
3.2.1. Organizational structure	23
3.2.2. Response Coordination.....	25
3.2.3. Domestic Legislation and International Agreements	31
3.2.4. Equipment, training and exercise.....	35
3.2.5. Finance	37
CHAPTER 4 - THE IMPACTS OF RATIFYING AND IMPLEMENTING OPRC TO VIETNAM	39
4.1. Arising rights and obligations of Vietnam.....	39
4.1.1. Rights	41
4.1.2. Obligations.....	42
4.2. Assessment of Vietnam’s capacity building to meet the requirements of OPRC	43
CHAPTER 5 - THE BARRIERS, CHALLENGES AND OPPORTUNITY IN VIETNAM FOR RATIFYING AND IMPLEMENTING OPRC	46
5.1. Barriers and challenges	46
5.1.1. Oil spill response model.....	46
5.1.2. Collaborative work to implement response.....	47
5.1.3. The current capacity of the specialized agencies in the proposed study of maritime conventions.....	49
5.2. The effectiveness of the ratification and implementation of the OPRC Convention in Vietnam: A SWOT (Strengths, Weaknesses, Opportunities and Threats) Analysis	49
CHAPTER 6 - CONCLUSION AND RECOMMENDATIONS	53
6.1. Conclusion	53
6.2. Proposed roadmap to ratify and implement the OPRC in Vietnam.....	54
REFERENCES.....	57
APPENDIXES	63

APPENDIX 1 - LIST OF THE MEMBER STATES OF THE INTERNATIONAL CONVENTION FOR THE PREPAREDNESS, RESPONSE AND COOPERATION OF OIL SPILL INCIDENTS, 1990 (OPRC) UP TO 28/7/2017 OF IMO63

APPENDIX 2 - LIST OF INTERNATIONAL CONVENTIONS RELATED TO OIL SPILL INCIDENT RESPONSE TO WHICH VIETNAM IS A MEMBER STATE66

APPENDIX 3 - LIST OF VIETNAM’S LEGAL DOCUMENTS RELATING TO THE PREVENTION OF MARITIME ENVIRONMENTAL POLLUTION.....68

APPENDIX 4- LIST OF OIL SPILL RESPONSE FACILITIES AND EQUIPMENT OF REGIONAL OIL SPILL RESPONSE CENTERS.....73

LIST OF TABLES

Table 1: The oil spill tier classifications in the Philippines	15
Table 2: The different sources of oil spills and frequency of occurrence, with its relative percentage of impact on the marine environment from 1997 to present	22
Table 3: Ecologically sensitive areas should be protected when spill occurs	28
Table 4: The major issues of the strengths, weaknesses, opportunities and threats to ratify and implement OPRC Convention in Vietnam	50

LIST OF FIGURES

Figure 1: Major crude oil trade flowed in the South China Sea (million barrels per day) in 2011	3
Figure 2: Map of Vietnam	4
Figure 3: Ten Parties of the MOU	12
Figure 4: Map of Philippines	14
Figure 5: Map of Singapore	16
Figure 6: Map of 11 countries in Southeast Asia.....	19
Figure 7: Oil content in some coastal areas of Quang Ninh province in 2009-2010.....	20
Figure 8: South China Sea oil and natural gas	21
Figure 9: Organization chart of oil spill response management in Vietnam	24
Figure 10: Oil spill response areas of Vietnam.....	26
Figure 11: Diagram of oil spill incident response process.....	27
Figure 12: 16 MPAs have been established in Vietnam.....	30

LIST OF ABBREVIATIONS

ASEAN	The Association of Southeast Asian Nations
ATM	ASEAN Transport Ministers
BDPP	Binh Dinh Province Portal
BUNKER	The International Convention for Civil Liability for Bunker Oil Pollution Damage, 2001
BR	Biosphere Reserves
CLC	The International Convention on Civil Liability for Oil Pollution Damage
DO	Diesel oil
DWT	Deadweight tonnage
EIA	U.S. Energy Information Administration
FO	Fuel oil
FUND	The International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1992
GESAMP	The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
IMO	The International Maritime Organization
IOPC Funds	The International Oil Pollution Compensation Funds
ITOPT	The International Tanker Owners Pollution Federation Limited
LAO PDR	The Lao People's Democratic Republic
MARPOL	The International Convention for the Prevention of Pollution from Ships
MEPCOM	The Marine Environmental Protection Command
MESCD	Marine Environment Survey and Control Department
MONRE	Ministry of Natural Resources and Environment of Vietnam
MOT	Ministry of Transport of Vietnam
MOU	Memorandum of Understanding on ASEAN Cooperation Mechanism for Joint Oil Spill Preparedness and Response
MPA	The Maritime and Port Authority of Singapore
NOCOP	The National Operations Centre for Oil Pollution

NOSCP	The National Oil Spill Contingency Plan
NP	National Park
OPRC	International Convention on Oil Pollution Preparedness, Response and Co-Operation, 1990
OPRC-HNS	Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000
OSRAP	The ASEAN Oil Spill Response Action Plan
PCG	The Philippine Coast Guard
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PM	Prime Minister
SACEP	South Asian Co-operative Environmental Programme
SWOT	The strengths, weaknesses, opportunities and threats
RAMSAR	Convention on Wetlands of International Importance Especially as Waterfowl Habitat
RS	RAMSAR Sites
UNCLOS	United Nation Convention on the Law of the Sea, 1982
UNCTAD	The United Nations Conference on Trade and Development
UNESCO	The United Nations Educational, Scientific and Cultural Organization
USD	United States Dollar
VASI	The Vietnam Administration for Seas and Islands
VIETSOVPETRO	Russia-Vietnam Joint Venture
VINAMARINE	Vietnam Maritime Administration
VND	Vietnamese Dong
VNIO	Institute of Oceanography
WCMRC	Western Canada Marine Response Corporation.
WH	World Heritage
WMU	World Maritime University

CHAPTER 1 - INTRODUCTION

1.1. Background

Today, maritime transportation plays a very important role in the development of global economic activities, with 90 percent of world trade transported by sea (UNCTAD, 2016). Shipping is a key element of the trade chain worldwide, carrying goods between countries and continents. A nearly third of global maritime trade is in petroleum fuel, the most important form of energy for many countries. Such high levels of maritime transport of fuel raises the potential risk of oil spill incidents (IMO, 2011; UNCTAD, 2016).

About 1.3 million tons of oil per year enters the marine environment from a variety of sources including 46% of natural oil seeps, 37% of operational discharge from ships and from land-based resources, 12% of accidental spills from ships and 3% of other sources (GPA, n.d.). Marine oil spills are unforeseen and their impact depends on several factors including the quantity and type of oil, time of year, characteristics of the area, weather conditions where the incident occurred, and type of clean-up measures (ITOPF, 2014). Oil spills, often referred to as “the Black Tide”, usually inflict significant damage to the marine environment. The destruction caused by leaking oil from those incidents can be wide and intensive and have ecological impacts on marine biodiversity and resources such as seabirds, the seabed and plankton as well as socio-economic impacts on the fishing industry (ITOPF, 2014). Moreover, oil spills can be widespread and cause major persisting damage to the coastlines of a state, and possibly neighboring states as well. Clean up and recovery operations from such emergencies are often very expensive (Clifton, 2014; IOPC Funds, 2015).

Recognizing the serious damage caused by oil incidents, and the importance of marine pollution prevention from ships, the International Maritime Organization (IMO) has established several conventions relating to prevention of pollution by oil. These include the International Convention for the Prevention of Pollution from Ships (MARPOL), the International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC), the International Convention on the Establishment

of an International Fund for Compensation for Oil Pollution Damage (FUND 1992), Civil Liability for Bunker Oil Pollution Damage, 2001 (BUNKER) and Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 (OPRC-HNS Protocol) (IMO, n.d.). However, these conventions are particular to different stages of prevention, preparedness and response, or liability and compensation. To prepare for and respond to oil spill incidents effectively, OPRC has emerged as a legal framework with the requirements for developing detailed plans, ensuring the availability of adequate equipment and assisting other parties in national, regional and international systems (IMO, 1996). According to the regulations of OPRC, each member country has the responsibility to build a national system, oil spill contingency plans, reporting of any oil incidents that happen in their jurisdiction or nearest coastal state and coordinating with other countries combating oil spill incidents. IMO actively assists cooperation of parties by providing technical assistance. For example, IMO plays an important role in the development of the Association of South-East Asian Nations Oil Spill Response Action Plan (IMO, 1996). OPRC entered into force on May 13, 1995, with the objective of providing measures with regard to oil spill incidents in national waters and in cooperation with other countries. According to the newest updated status of the IMO Conventions on July 31, 2017, ORPC was ratified by 112 countries that account for over 75.33% of the total world fleet tonnage (IMO, 2017).

The Southeast Asia region contains ten nations namely Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam. The region's economic development is rapid, including major shipping trade routes in the world between the South China Sea and the Indian Ocean, Pacific Ocean, Europe, Africa, the Middle East, Japan and China with more than 120,000 ships operating through the water each year. Each year, there is a huge volume of global natural gas and crude oil, which passes through the South China Sea by maritime transport; thus, this region is facing the high potential of oil spill pollution, shown in Figure 1 (Warner, 2015; EIA, 2011).

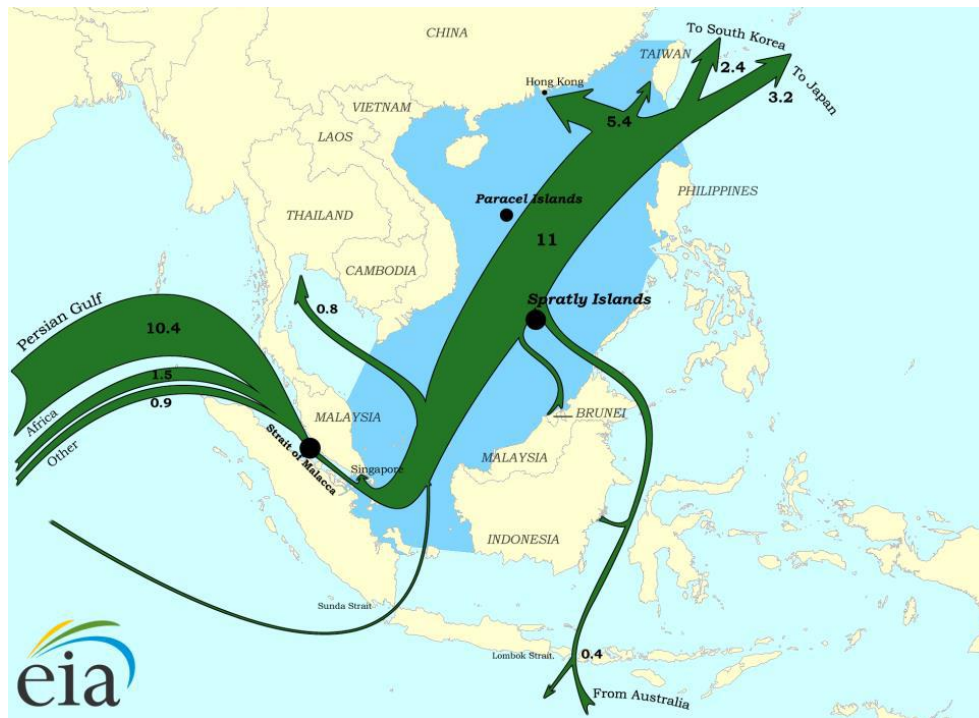


Figure 1: Major crude oil trade flowed in the South China Sea (million barrels per day) in 2011

(Source: Energy Information Administration, 2013).

To address the problems in the Southeast Asia region, the Memorandum of Understanding (MOU) for Joint Oil Spill Preparedness and Response, which is based on ORPC 1990, was signed on November 2014 in Myanmar by ASEAN members (ASEAN, 2014). In addition, several bilateral/multilateral agreements on cooperation in responding to and preparing for oil spills were also signed among ASEAN countries. For example, the Joint Statement to prepare and respond to oil incidents in the Gulf of Thailand was signed by Cambodia, Thailand and Vietnam in 2006 (Nguyen, n.d.) and the Memorandum of Agreement between Vietnam and the Philippines signed in 2010 (Department of Foreign Affairs of the Philippines, 2010). Hence, these agreements have enhanced regional and national capabilities concerning prevention, preparedness and response for oil spills in the Southeast Asia region.



Figure 2: Map of Vietnam

(Source: mapsoword, n.d.)

Vietnam is a country with approximately 3,260 km of coastline and 1 million km² of seawater surface. It also boasts among the richest biodiversity in the world, with nearly 11,000 species of marine animals, seabirds and plants as well as 1.22 km² of coral reefs along the coast (Pham, 2013). Its maritime industry has recovered after the economic crisis in 2008, and continued to reach the objectives of the Master Plan on Development of Maritime Industry to 2020, aiming for 11.8-13.2 million DWT for the fleet and 215-260 million tons of the volume of goods transported. Indeed, in 2015, the total volume of goods through 44 Vietnamese major ports reached more than 427 million tons, higher than 14.7% of the volume in 2014, exceeding the objectives of the

Plan. Moreover, the total size of Vietnam's shipping fleet was 1,806 ships in 2015 with 4 million DWT, and their average age was approximately 12 years (Vietnam Maritime Administration, 2016). The rapid development of Vietnam's marine industry potentially affects the marine environment and aquatic resources in widespread areas, as well as economic development and coastal populations. According to the report of the Vietnam Administration of Seas and Island from 1987 to 2016, approximately 90 oil spill incidents happened in Vietnam. Especially, in the period from 2006 to 2007, unidentified oil pollution spilled into about 20 coastal provinces, with 1,700 tons of oil collected (Pham, 2013). For example, in the "*My Dinh*" incident in Quang Ninh Province in 2006, 50 tons of diesel oil (DO) and 150 tons of fuel oil (FO) were spilled, but merely 65 tons were collected; the rest was still at sea. This area is near the United Nations Educational Scientific and Cultural Organization (UNESCO) World Heritage Site Ha Long Bay (MONRE, 2013). Furthermore, oil spilled in Binh Dinh Province in 2013. The spill affected more than 13,812 m² of fishery area, killed numerous fishes and marine species as well as polluted 7 km of shoreline (BDPP, 2013). These oil spills could result in serious consequences, if they occurred in sensitive areas such as Ha Long Bay, Cat Ba, Con Dao and others. The effective operation of the response and preparedness regime to address oil spill incidents is essential.

Recently, Vietnam has actively ratified many international conventions to enhance marine environmental protection including the United Nation Convention on the Law of the Sea (UNCLOS) 1982, BUNKER 2001, the International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC 1969) and MARPOL (Mai, 2013). Due to conflicts over the management of oil spill response among government agencies and limitation in maritime agencies management capacities, Vietnam is yet to ratify OPRC 1990, which is an important legal framework for response and preparedness in combating oil spills. If Vietnam ratifies OPRC 1990 and implements other international conventions related to combating marine pollution and other regional cooperation arrangements, it will enhance its protection of the marine environment. With being responsible for protecting the marine environment in the country as well

as in the region, it is the motivation of this research to review and assess the capability and commitment of Vietnam to ratify and implement OPRC.

1.2. Objectives

The rapid development in Vietnam's maritime industry increases the probability and risk of spills, causing deterioration of the marine environment (MONRE, 2016). In fact, the Vietnamese government has recognized the problem and actively implemented essential actions including the ratification of MARPOL, BUNKER and other conventions. To enhance the operation of addressing oil spills, the purpose of this research is to review and critically analyze the state of preparation for and responding to oil spills in Vietnam make recommendations for ratifying the OPRC Convention. The perspective of this study would enhance the speedy implementation of the OPRC convention as well as the management of oil spill combat in Vietnam.

To achieve the aims, this study is based on the following objectives:

- To assess the potential risks and impacts of oil spills to Vietnam's marine environment;
- To analyze and assess the impact of Vietnam ratifying OPRC, including social-economic, environmental, and legal regulation aspects;
- To assess and compare the preparedness for and response to oil spills in Singapore and Philippines, which have ratified OPRC 1990, and are two members of the MOU in the Southeast Asia Region to provide lessons for Vietnam; and
- To study the barriers and challenges that are keeping Vietnam from ratifying the OPRC.

1.3. Research Methodology

The study was conducted by using the qualitative approach, which is based on documents of IMO, books, academic journals, published studies and reliable websites via the library at the World Maritime University (WMU) from Vietnam. In addition, interviews were conducted remotely or through face-to-face interviews with relevant organizations and individuals that work not only in marine organizations, namely the

Vietnam Maritime Administration and Vietnam Register, but also in others such as the Vietnam Administration of Seas and Island, Vietnam Environment Administration and other Oil Spill Response Centers.

Furthermore, to fulfill the requirements of ratification of the OPRC in Vietnam, specific data and deep knowledge of oil spills in Vietnam and that gained by various views of Vietnam experts from different organizations, will be presented. Good practice of the maritime fields and neighboring countries such as Singapore, the Philippines will also be provided. After that, the collected data and the practice were analyzed and examined to measure the current capability of Vietnam in comparison with the regulations of the OPRC Convention.

In addition, a SWOT analysis was conducted to assess Vietnam's strengths and weaknesses overall as well as evolving opportunities and threats to ratify and implement the OPRC Convention including legal, political, social, economic, and ecological factors related to oil spill response in Vietnam.

1.4. Scope and limitations of the study

This study of the challenges to ratifying OPRC in Vietnam is a wide-ranging topic that covers not only the marine aspect but also other aspects such as international cooperation, political mechanisms and the operational response of oil spills in different organizations including Naval services belonging to the Ministry of Defense, private companies and oil spill response centers. On the other hand, almost all reports on oil spill response that belong to government offices are not often updated via the official documents, webpages, technology and science journals. Consequently, it is very difficult to access the necessary and relevant information from governmental offices in Vietnam regarding oil spill response activities. This lack of data could lead to failure in conducting a thorough and accurate analysis of oil spills in general. Moreover, time was limited for conducting the research and write up. Therefore, the author intentionally covers relevant data of response to oil spill activities in Vietnam and considers essential elements for the research.

1.5. Structure of the Dissertation

The dissertation is comprised of six chapters. Chapter 1 presents the preliminary aspects of the dissertation with a background of the study. Chapter 2 describes the overview of oil spills Preparedness, Response and Co-Operation, including the introduction to the OPRC Convention, the MOU and ASEAN Oil Spill Contingency Plan. Chapters 3 and 4 analyze and assess Vietnam's capacity for oil spill preparedness and response throughout social-economic, environmental and legal aspects to ratify and implement the OPRC Convention. Chapter 5 gives a critical view of the oil spill preparedness and response capabilities in Vietnam to reveal the "barriers and challenges" for ratification and implementation. Chapter 6, the conclusion chapter, summarizes the dissertation with recommendations to overcome the current gaps and existing weaknesses relevant to the problems in Vietnam after assessing all information and data. Finally, it suggests a roadmap for Vietnam to ratify the OPRC Convention in the most practical and possible way.

CHAPTER 2 - OVERVIEW OF OIL POLLUTION PREPAREDNESS, RESPONSE AND CO-OPERATION

2.1. Overview of the International Convention on Oil Pollution Preparedness, Response, and Co-Operation, 1990 (OPRC)

Before the adoption of the International Convention on Oil Pollution Preparedness, Response, and Co-Operation, 1990 (OPRC), several large oil spills occurred, such as the “*Torrey Canyon*” oil spill in the English Channel in 1967, “*Amoco Cadiz*” in North West Coast of France in 1978, and “*Exxon Valdez*” in Alaska in 1989. Especially, “*Exxon Valdez*” is one of the most expensive oil spills in history with the total damage costing about \$5 billion. That influenced the decision of the leading industrial national conference in Paris in July, 1989 (Oliveira, n.d.) that called upon the International Maritime Organization (IMO) to develop further measures to prevent marine pollution from ships; that led the IMO Assembly to draft a new convention (Edwards, 1993).

On November 30th 1990, OPRC was adopted and came into force in May 13th 1995 (IMO, n.d.). The Contracting States to OPRC are required to establish measures for response to control marine pollution incidents that can be covered in their countries or in cooperation with other nations. A highlight point of the Convention is the possibility of supporting and receiving assistance to combat oil pollution incidents from ships and relevant units such as seaports, oil industries and oil handling facilities (Edwards, 1993; Oliveira, n.d.).

According to the newest status of treaties provided by IMO on May 11, 2017, 112 Contracting States have ratified the OPRC Convention, accounting for 75.33% of the world fleet (IMO, 2017).

2.1.1. The purpose and benefits of the OPRC

The aim of the Convention is to provide a global legal framework for mutual assistance and international cooperation on the issues related to combating oil pollution incidents or marine pollution by enhancing information exchange, preparing emergency

response plans for oil spills, promoting and sharing research results in preparedness and response to major oil spill incidents, and contributing to building national and regional capacity for preparing for and responding to oil pollution (Ornitz & Champ, 2002).

In addition, the ratification of the Convention has provided a number of benefits for the Contracting States. First, the OPRC Convention plays an important role in promoting the possibilities of cooperation and mutual assistance between national and regional levels. It also enhances existing national capabilities to conclude bilateral or multilateral agreements in regards to the preparedness and response to oil pollution incidents. Second, it provides the possibility of prompt response accessing technical assistance and the available resources in case of accident. Third, the Contracting Parties shall provide a framework to prepare for and respond to oil pollution including national contingency plans, authority responsible and combating equipment. Last is the establishment of a network for the exchange of research and development programs, practical experiences and best practices among the Parties in oil spill response (Ornitz & Champ, 2002; IMO, n.d.)

2.1.2. The basic contents of OPRC

The OPRC Convention is an international legal document that regulates issues related to oil pollution preparedness, response and cooperation, which underlines the coordinating role of the International Maritime Organization (IMO) (IMO, n.d.). This Convention contains 19 Articles, 1 Annex and 10 Assembly Resolutions with the common parts including preamble, definitions, reporting procedures, international cooperation, bilateral and multilateral cooperation in preparedness and response, provisions for amendments, signatures and effective time as well as procedures for denunciation and depositary and languages used. Some of the major contents of the Convention are listed as follows:

- All oil tankers of 150 gross tonnage and above and other ships over 400 gross tonnage shall be required to have or develop a shipboard oil pollution emergency plans, which has the content prescribed by IMO (Article 3.1);

- The Convention encourages the establishment of national and regional systems to respond to oil pollution incidents (Article 6) that should include at least the following elements:
 - + The State shall designate a competent national authority for oil pollution response and a national contact point for receiving and transmitting oil pollution reports (Article 6.1.a)
 - + National plan, emergency response stockpiles of equipment for preparedness and response to oil spill (Article 6.1.b and Article 6.2.a)
 - + Rehearsal and training programs for relevant organization (Article 6.2.b)
 - + Mechanisms to coordinate the response activities to oil pollution incidents (Article 6.2.d)
 - + Information must be shared with IMO or regional bodies on the contingency plans, response equipment and expertise that can be available to another State when requested (Article 6.3)
- Encouragement of international cooperation, in case of response to oil pollution, to mobilize resources as much as possible and carry out related activities quickly. The contracting parties agree to cooperate to promote and exchange research and development programs dealing with maritime pollution issues, and provide technical cooperation and equipment upon request from other states (Articles 7, 8 and 9);
- Promotion of bilateral and multilateral cooperation in preparedness and response to oil pollution (Article 10);
- IMO shall assist in enhancing the ability of each States or regional arrangement in terms of oil spill accident preparedness and response, focusing on some main aspects such as promotion of information services, education and training, supply of technical services and technical assistance upon the States' request in case of major oil spill incidents (Article 12) (IMO, n.d.).

2.2. Introduction to Memorandum of Understanding on ASEAN Cooperation Mechanism for Joint Oil Spill Preparedness and Response

The Memorandum of Understanding on ASEAN Cooperation Mechanism for Oil Spill Preparedness and Response (the MOU) was signed by Transport Ministers during the 20th ASEAN Transport Ministers (ATM) Meeting on 28 November 2014. The Parties of the MOU are 10 Member countries including Brunei Darussalam, the Kingdom of Cambodia, the Republic of Indonesia, the Lao PDR, Malaysia, the Republic of the Union of Myanmar, the Republic of the Philippines, the Republic of Singapore, the Kingdom of Thailand and the Socialist Republic of Vietnam, shown in Figure 3 (ASEAN, 2014).

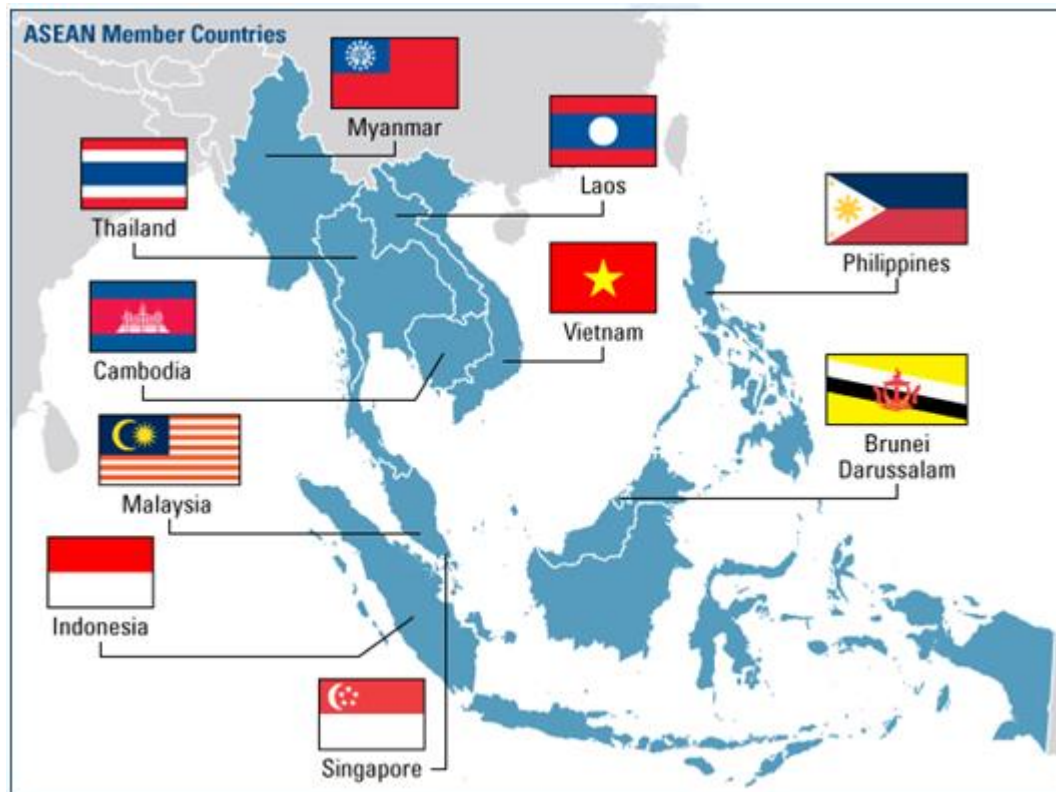


Figure 3: Ten Parties of the MOU

(Source: ASEAN, n.d.)

The Memorandum of Understanding is based on the provisions of the OPRC Convention, particularly articles 5, 6, 7 and 10. The areas of cooperation shall be achieved through the implementation of the MOU, including:

- Implement IMO instruments to prepare, minimize and control oil pollution;
- Establish appropriate measures to prepare for and respond to oil spill incidents;
- Develop a Regional Oil Spill Contingency Plan to coordinate response to oil spills in the ASEAN region;
- Develop programs and plans to enhance the capacity and capability of ASEAN members through joint practical exercises or training courses at all levels on oil spill preparedness, response and cooperation;
- Share and exchange information to enhance researching and studying levels on the technical and scientific aspects in the field of preparedness and response for oil spill incidents; and
- Promote partnerships among stakeholders including ASEAN members, governmental and non-governmental organizations, oil and gas industries and shipping industries.

According to the requirement of the MOU, there shall be developed a Regional Oil Spill Contingency Plan that provides a mechanism for mutual assistance among competent authorities of ASEAN members to coordinate and integrate appropriate response activities to marine pollution incidents that affect the territorial sea, coast or the interests of one or many countries. The aim is to organize promptly and effectively the response to oil spill incidents occurring in the territorial sea of one or more members in the ASEAN region in terms of preparedness, response and cooperation (Guevarra, 2015).

2.3. Overview on the implementation of oil pollution preparedness and response in Singapore and the Philippines

In line with ASEAN's interest in oil spill response activities, Singapore and the Philippines are parties to both the OPRC Convention and the MOU (Guevarra, 2015). As one of the largest shipping trade volumes in the world with the total tonnage handled 593.3 million tons including 221.4 million tons of bulk cargo in 2016, Singapore, through the annual implementation of the Joint Oil Spill Exercise (JOSE)

has demonstrated in recent years, commitment to respect its international obligation to fully implement oil spill response incidents (MPA, n.d., 2016). In 2006, the Philippines experienced a large oil spill incident (more than 500 tons) and they have closely cooperated with Vietnam in regard to oil spill response such as bilateral agreements on search and rescue exercises annually (Dao & Nguyen, n.d). The activities of these countries, have led to effective implementation of oil pollution preparedness and response with the consideration of some main aspects such as oil spill response model, system, plan, collaborative arrangements.

2.3.1. Oil pollution preparedness and response of the Philippines



Figure 4: Map of Philippines

(Source: mapsofword, n.d.)

Since the “*M/V Solar 1*” oil spill in central Philippines in August 2006, which caused serious environmental hazards affecting fishing ground, pollution of sensitive sea areas

and dive spots, the Philippine government has reviewed their national response at all levels, including the revision of the National Oil Spill Response Plan (NOSCP), which was completed in 2008 (ITOPF, 2010; Parker et al., 2009). This comprehensive plan has introduced government management systems at three Tier levels with the integration of government agencies and related stakeholders of the oil and gas industry such as Petron Corporation, the largest oil company in the Philippines. Petron Corporation has transportation systems, response equipment stores and human resources throughout this country (ITOPF, 2010).

According to the NOSCP, the Philippine Coast Guard (PCG) is the responsible agency for organizing oil spill incident response in the country's territorial waters, including the Marine Environmental Protection Command (MEPCOM) as the contract point of oil spill response operations and the National Operations Centre for Oil Pollution (NOCOP) as the national on-scene commander (Parker et al., 2009).

Table 1: The oil spill tier classifications in the Philippines

Tier	Volume	Response
I	Up to 10 m ³ of oil spilled	The capability of Facility/Onboard Other industries (if necessary)
II	Up to 1,000 m ³	Other industries, Oil spill response organizations and government agencies
III	More than 1,000 m ³	Total national resources and foreign resources

(Source: Parker et al., 2009)

At the level of a Tier 1 spill, each facility or vessel shall have to carry out self-handling of oil spills according to their approved plan, and the PCG is involved in government oversight of the response process. For a Tier 2 spill, a facility or vessel is required to implement their response plan but the local PCG plays the on-scene commander role. For a Tier 3 spill, the PCG implements response activities at the national level, calling for assistance from international resources as needed. Oil spill response facilities and equipment include skimmers, booms, storage tanks, dispersant and sorbent, vessel-

based dispersant sprayers, transfer pumps, and cleaning and recovery equipment from Government and oil industry resources (ITOPF, 2010).

Currently, the Philippines has regional and bilateral agreements with ASEAN countries including Memoranda of Understanding for oil spill response with Thailand, Indonesia and Vietnam, together with participation in the regional plans and program such as the Sulawesi Sea Oil Spill Response Network, the ASEAN - OSRAP, Regional Program for the Prevention and Management of Marine Pollution in the East Asian Seas with the ASEAN countries (Warner, 2015). Especially, the Philippines ratified the OPRC Convention on May 6, 2014 to strengthen the legal framework for the preparedness and response of oil spill pollution (ECOLEX, n.d.).

2.3.2. Oil pollution preparedness and response of Singapore

Singapore is situated close to a main global oil trading shipping route and has one of the busiest ports in the world (McKinnon, 2011; UNCTAD, 2016).



Figure 5: Map of Singapore

(Source: mapsofword, n.d.)

The Maritime and Port Authority of Singapore (MPA) is the national maritime agency responsible for preventing and responding to oil spills in Singapore's territorial waters. The MPA has developed Marine Emergency Action Procedures (MEAP) for combating all marine emergencies, including emergency oil spills in all three tiers of oil spill incidents with the specific role of the National Environment Agency of Singapore and the relevant agencies as well as response resources in government, organizations and companies concerned to the plan (SEA ALARM, 2009). For example, the MPA and ITOPF signed a Memorandum of Understanding (MOU) in September 2007 to agree to the joint deployment of means and facilities as well as technical assistance in oil spill incidents from a vessel insured by the International Group of P & I Clubs (ITOPF, 2009).

There are three tier spill responses in Singapore's waters. For Tier 1, a local incident shall be managed by the vessel and terminal's own capabilities. For Tier 2, an oil spill incident with a wider extent of pollution is implemented by MPA with the support of government agencies and relevant stakeholders. For the Tier 3, incidents of national interest with high spill risk for large-scale impacts is required all local resources and potentially overseas resources. Singapore's response resources come mostly from private companies. The oil spill equipment of MPA is provided by the Japanese Transport Ministry including booms, flexible storage tanks, skimmers and dispersant spraying equipment. In addition, Singapore's oil industry spill response units have collaborated to respond large oil spills in the Asia-Pacific region, establishing the possibility of response capability in the Malacca and Singapore Straits (ITOPF, 2009).

To deal with an oil spill, Singapore conducts an annual multi-agency Joint Oil Spill Exercise (JOSE) to check the use of the coordinative oil spill response system, management strategies and technologies and ensure its seaport remain secure, safe and clean from shipping activities. Relevant agencies and stakeholders which are involved in shipping activities such as MPA, Environment Agencies, Ministries of Health and of Foreign Affairs, Police Force and petroleum companies are required by Singapore government, to cooperate effectively and efficiently at regional and national level. (MPA, 2016). According to the implementation of the OPRC Convention 1990 and

OPRC/HNS Protocol 2000, Singapore promulgated the Instrument of Accession to the Protocol in October 2003 to improve the national contingency plan and improve response to oil spills in Singapore's water particularly and in the ASEAN region generally (Warner, 2015).

2.4. The strengths of Singapore and the Philippines can be applied to Vietnam

Based on the oil spill response capacity of the Philippines and Singapore, it points out that these two countries have already assigned the specialized agencies in charge of oil spill response in their respective countries, as Philippines Coast Guard and Maritime Port Authority, respectively, employ the same model with other countries in the world. Both of the countries have developed oil spill response plans for all three levels, including base, regional and national levels (Trinh, 2011). In order to increase the efficiency of mobilizing equipment and save on investment cost, Singapore has signed a contract with ITOPT and the International Group of P & I Clubs, and has cooperated with neighboring countries and international organizations to address oil spills at the national level. In addition, these two countries are members of the OPRC Convention and the ASEAN Oil Spill Response Action Plan (OSRAP), which is also an advantage for all countries in the Southeast Asia Region to organize oil spill incident response exercises in the recent years (Thailand Marine Department, n.d.)

In to order improve the response to oil spills incidents and effectively implement the signed MOU, Vietnam should consider the oil incident response model, plan, annually conduct Joint Oil Spill Exercise of multi-agencies, and ratify the OPRC Convention, as the two countries are carrying out (MONRE, 2015). For instance, the cooperation in coping with oil spill incident is one of the core factor in improving the capacity of national organizations as it relates to, deployment of coordination exercises by stakeholders and government agencies, exchange of experience and best practices including assistance among ASEAN members, the IMO, member States of OPRC Convention and oil spill response organizations (such as the International Group of P&I Clubs, and International Association of Oil and Gas producers) (ITOPF, 2009; VINAMARINE, 2015).

CHAPTER 3 - OVERVIEW OF OIL SPILL PREPAREDNESS AND RESPONSE IN VIETNAM

3.1. The potential risks and impacts of oil spills on the marine environment and socio-economic conditions in Vietnam

Vietnam is located within Southeast Asia, which is one of the busiest shipping routes in the world. Every year, about 70% of imported oil and about 45% of Japan's exports are transported, and about 60% of imports and exports of China are transported by sea through the South China Sea. The South China Sea area has important straits for many countries, including the Strait of Malacca. Therefore, this maritime area is very important to all countries in and outside the region in terms of strategy, security, navigation and economy (Mai, n.d.).



Figure 6: Map of 11 countries in Southeast Asia

(Source: Reischig, T., n.d.)

Vietnam is a coastal country with coastlines stretching more than 3,260 km and a dense system of canals and rivers. There is a high demand for oil and gas consumption and exploration that potentially increase the risk of oil spills (Pham, 2013). Moreover, Vietnam's maritime activity is growing rapidly which has led to an increased risk of oil spills. Most recently, Vietnam has an estimate of 1,806 ships and the seaport system which includes 44 ports with a total length of wharf nearly 40 km. In 2015, more than 119,744 ships were arriving at Vietnamese ports with total cargo output of approximately 259 million tons (VINAMARINE, 2016). The rapid development of Vietnam in recent years is increasing its demand for energy. However, the primary source of energy is coal, crude oil and gas, causing serious environmental pollution in Vietnam. Oil spills being the major threat to the marine environment and coastal areas in Vietnam, has been caused by shipping activities resulting in collisions, accidental spills, illegal dispose of waste oil and oil leaks during transportation (Table 2) (MONRE, 2016). According to the report on Marine Pollution Control Plan in Quang Ninh Province, the oil contents in some coastal areas of Ha Long, Quang Ninh provinces exceeded the permitted limit of 0.2 mg/l for all oil component such as Cau Trang, Cai Rong seaports, Van Don coastal area and Ha Long wharf area (MESCD, 2013), shown in the Figure 7.

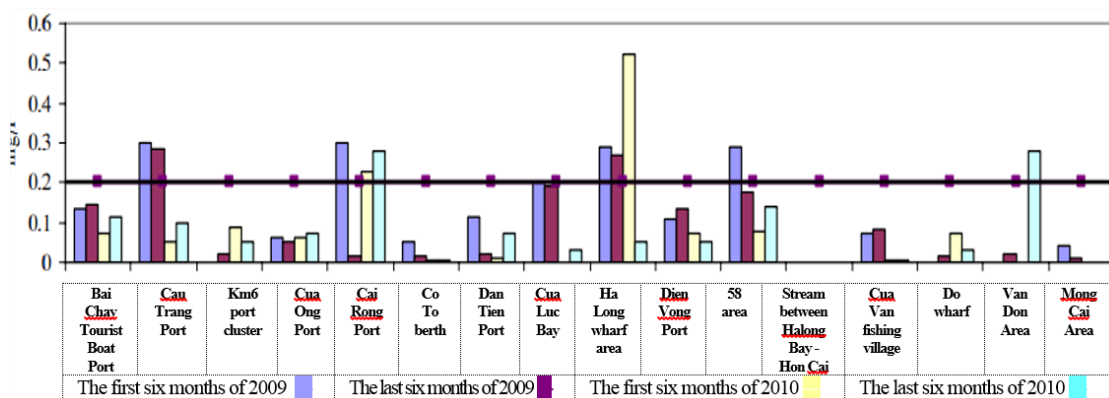


Figure 7: Oil content in some coastal areas of Quang Ninh province in 2009-2010

(Source: MESCD, 2013)

Moreover, a recent report by the Hai Phong Department of Natural Resources and Environment showed that the high salinity area is the water surface in the port area of

Hai Phong where the oil content is 0.3-0.6 mg/l, which exceeds the permitted environmental standards of Vietnam (0.2 mg/l). In the coastal waters of Hai An, Kien Thuy district in Hai Phong, the average oil content of about 0.6 mg/l is also higher than the permitted standard of Vietnam (MONRE, 2016).

Oil pollution in Vietnam also derives from oil and gas exploration and exploitation activities with approximately 1,390 exploration wells and offshore oil and gas fields distributed in the South China Sea including 340 exploration wells and oil and gas extraction of Vietnam (Warner, 2015). Oil and gas activities generate not only large amounts of oil wastewater but also about 5,600 tons of oil sludge each year, as a result an estimate of one million tons of oil is spilled into the ocean by incidents on oil platforms (Nguyen, 2010). Oil tankers also lose an estimated 0.7% of oil during shipping process, according to the synthesized report on the formulation of economic and technical norms for assessment and determination of environmental damage caused by oil spills of Pollution Control Department, Vietnam (Pollution Control Department, 2012).

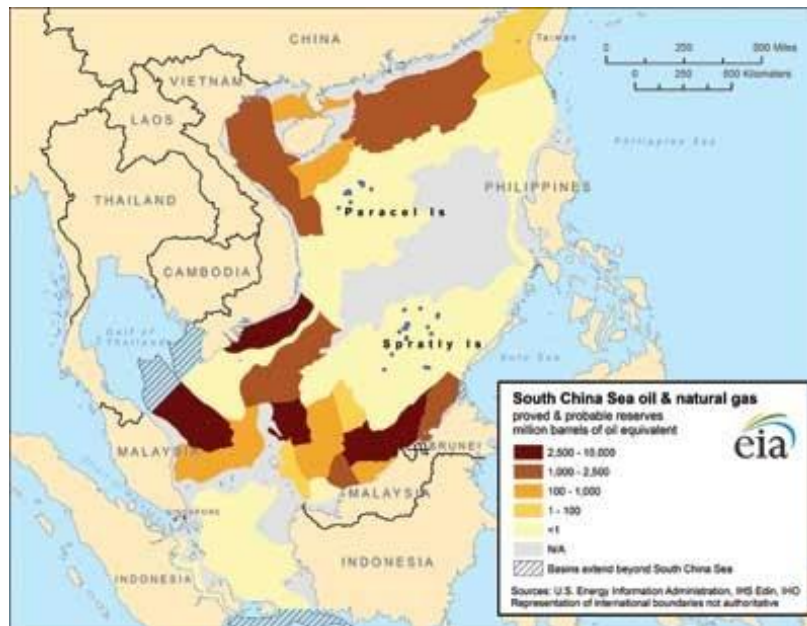


Figure 8: South China Sea oil and natural gas

(Source: EIA, n.d.)

Table 2: The different sources of oil spills and frequency of occurrence, with its relative percentage of impact on the marine environment from 1997 to present

No.	Source	Number of accidental spills	Percentage (%)
1	Shipping activities	66	73,3%
2	Offshore oil and gas installation	5	5,6%
3	Runoff from land-based sources	8	8,9
4	Others (unidentified sources)	11	12.2

(Source: MONRE, 2016; Pham, 2016)

According to the report by the Vietnam Administration of Seas and Island in 2016, 90 oil spills occurred in Vietnam’s sea and the rivers from 1997 to now but some sources of oil spills are yet to be identified (Pham, 2016). For instance, in August 2006, a 31,000 DWT vessel, “*La Palmas*”, carrying 23,000 tons of oil crashed into a berth at the Saigon Port and spilled more than 1,500 tons of oil into the environment. Moreover, 150 tons of oil leaked from the pipeline of the berth. Despite deploying incident response, after only 9 hours, the oil spread over an area of 40-50 km downstream of the Saigon River. Next, due to the influence of the tide, the oil was pushed back 4-5km upstream of the river from the oil incident. In addition, because of the ineffective and slow response, after 15 days, the areas were affected by the oil spill covered about 60,000 ha, of which the most severely affected covered 40,000 ha of densely populated area, which caused serious damage to coastal and marine ecosystems as well as hampered socio-economic activities in the Saigon River (Khac, 2010). For instance, aquaculture loss estimated 7 billion VND (~30,800 USD) within the region, which caused serious damage to vase areas of mangrove forests in Can Gio, as a result, the livelihood of local residents were affected, and most of tourist activities were suspended, wherein, approximately 13 days was used to respond to the oil incident (VINAMARINE, 2015).

At the end of February 2007, the unidentified oil slick was found on the shores of the three communes in Quang Binh spreading over 60 km of coastline from Nguy Thuy to

Thanh Trach district. After ten days, with the increase of density and the delay in response, tourism activities in the areas of Hai Ninh (Quang Ninh); Nhat Le, Bao Ninh, Quang Phu (Dong Hoi), had to be suspended. A high number of marine and aquatic species died and aquaculture operations were affected for more than a year in several areas of Hai Ninh (Quang Ninh); Nhat Le, Bao Ninh, Quang Phu (Dong Hoi); Da Nhay (Quang Binh) (DNRE, 2011).

Therefore, oil spills do not only have a negative impact on the environment but also have impact on economic and social activities as well as human health. The preparedness and prevention of oil spills need immediate attention that needs to be addressed not only as a national issue, but also in coordination with other nations in different regions around the world (Moller & Santner, 1997; Warner, 2015).

3.2. The current status of oil spill preparedness and response in Vietnam

3.2.1. Organizational structure

At present, the National Committee for Search and Rescue, representing the Government, is the lead agency for the implementation of oil spill response activities nationwide in accordance with the Decision no. 63/2000/QD-TTg dated 07/06/2000 of the Prime Minister. This organization shall assume the prime responsibility and coordinate with the concerned ministries and branches as well as directly mobilize means and equipment for local oil spill response organizations and centers to address the oil spills in the entire country (Nguyen, n.d.).

Responsibilities of relevant agencies and units to respond to oil spills are specified in Chapter V, Decision no. 02/2013/QD-TTg dated 14 January 2013 of the Prime Minister promulgating the Regulation on oil spill incident response (Decision no. 02/2013/QD-TTg). Specifically, according to Article 37 of the Decision no. 02/2013/QD-TTg, the Ministry of Natural Resources and Environment is responsible for drafting legal documents on monitoring, risk assessment as well as minimizing the effects of oil spills, together with coordinating concerned agencies in coping with, remedying and dealing with the consequences of spills. According to Article 38, Decision 02/2013/QD-TTg, the Ministry of Transport is responsible for promulgating

standards and technical regulations on prevention, response of oil spill incidents in the maritime field, and closely monitor oil and gas activities taking place in seaports and offshore areas and also responsible to coordinate or facilitate effective response to oil incidents (PM, 2013; VASI, 2017).

Currently, Vietnam has three regional oil spill response centers that are the leading force in responding to oil spills. The assigned regions are prepared to respond within the scope of Vietnam under the supervision and command of the National Committee for Search and Rescue in accordance with Article 44 of the Decision no. 02/2013/QD-TTg (VASI, 2017).

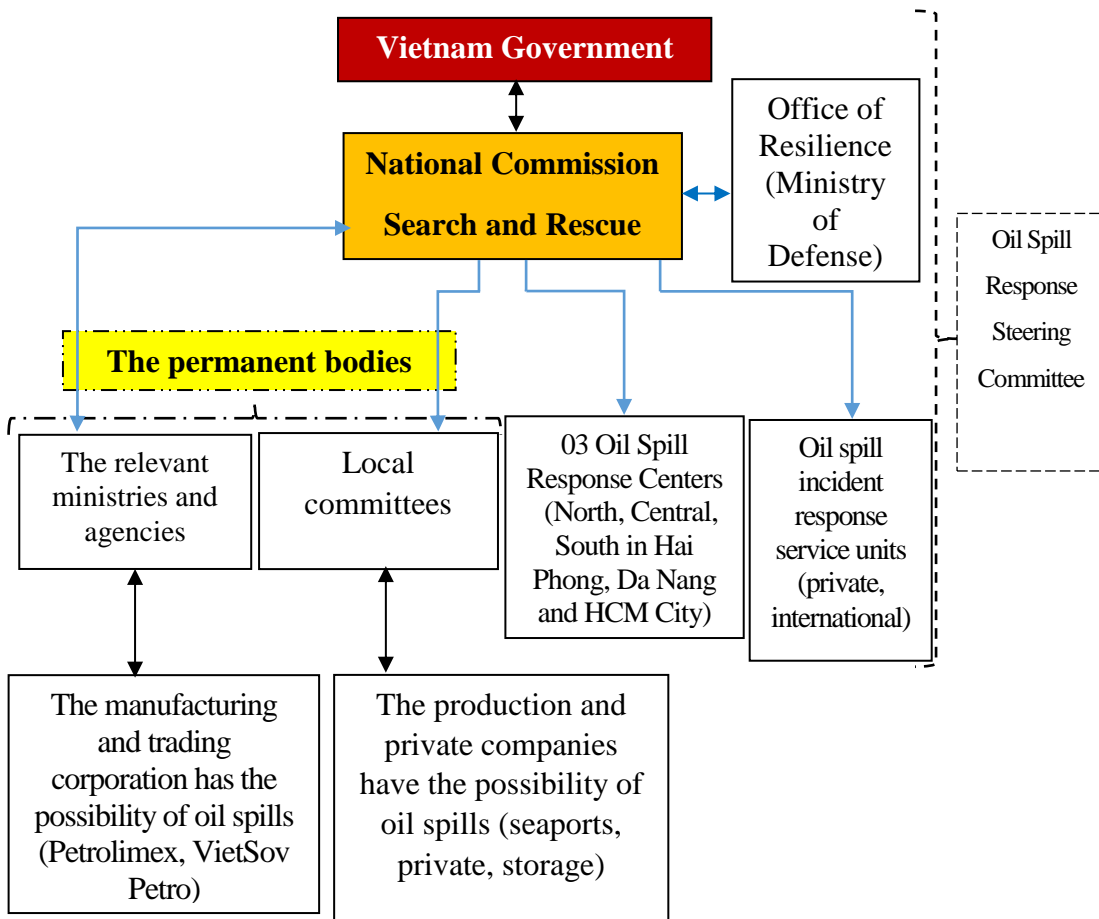


Figure 9: Organization chart of oil spill response management in Vietnam

(Source: VASI, 2017)

3.2.2. Response Coordination

Responding to oil spills is conducted at three levels, including local, regional and national levels. For the local level - level I, the oil spill response is implemented by socio-economic units with their facilities, equipment and human capacity approved by the local environment administration. These units organize the timely response and efficiency of oil spill occurrence within their scope, in regards to their ability and willingness to participate in a joint operation in responding to the oil spill incident under a mobilization or command of competent agencies. If these units' response capacity is limited, they must be contacted to response service units in the same local. Regional level responds through three Regional Response Centers (North - Central - South), which are the core response centers to oil spills of level II or higher in the assigned area. Particularly, the northern oil spill incident response center is responsible for responding to the northern provinces of Binh Thuan province, including the entire sea area of the Gulf of Tonkin with the latitude of 17°10'N (Zone1 and Zone 2). Similarly, the central oil spill disaster response area includes coastal areas from Quang Tri to Ninh Thuan, the marine area in the latitude from 17°10'N to 11°20'N (Zone 3 and 4). Finally, the southern oil spill response center covers the southern coastal provinces from Ninh Thuan to Ca Mau and Kien Giang, from the latitude of 11°20'N extends to the end of southern (Zone 5 and 6) (Nguyen, n.d.). At the national level, the National Committee for Search and Rescue is responsible for the coordination of regional centers, ministries, agencies, relevant stakeholders in coping with oil spills. For example, in the event of an oil spill that exceeds the national capacity, the National Committee for Search and Rescue shall propose to the Prime Minister to consider and decide on a request for international assistance (VASI, 2017).



Figure 10: Oil spill response areas of Vietnam

(Source: VINAMARINE, 2015)

When organizations or individuals cause or detect an oil spill, they have responsibility for promptly reporting it to the nearest focal point of the port authority or the Permanent Search and Rescue Agency of the concerned ministries, Regional Department of Natural Resources and Environment, Regional Oil Spill Response Center, Provincial People's Committee or Coastal Communications Stations or Naval Units, Border Guard and Waterway Traffic Police. After receiving the information, the agency responsible for oil spill response must urgently assess the situation, identify effective measures and mobilize forces to respond and minimize the negative impact of the spill on people's lives, health and environment (PM, 2013; VINAMARINE, 2015). The oil spill incident response map is presented in Figure 11.

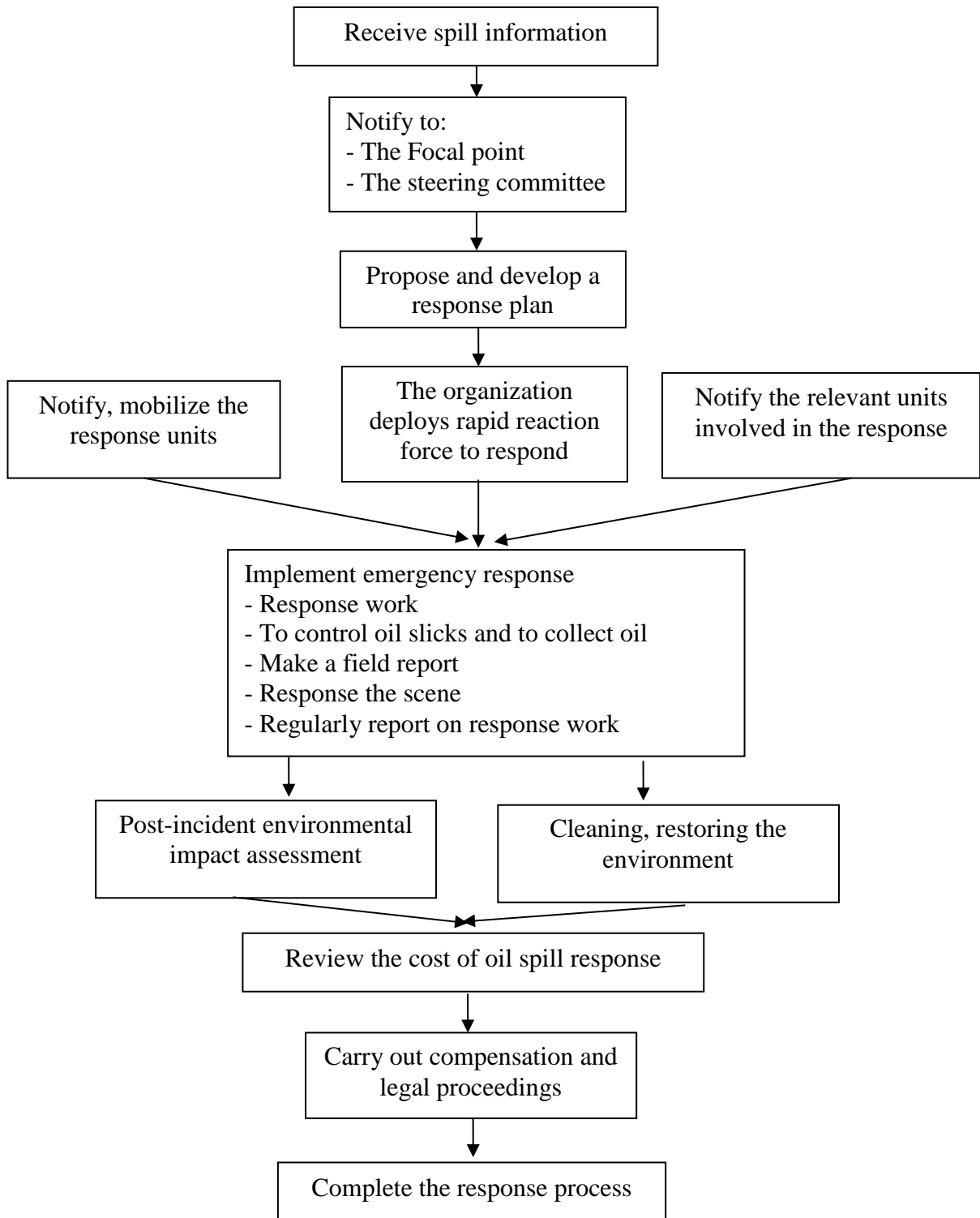


Figure 11: Diagram of oil spill incident response process

(Source: VINAMARINE, 2015)

During the response to the oil spill incident at sea, the Steering Committee should identify areas of ecological importance so as to prioritize the protection to minimize or reduce the effects of the spill on the environment and the ecosystems of that area (Nguyen, 2008). Along the coast of Vietnam and the sea area of Vietnam's sovereignty, there are 23 areas of sensitive ecosystems, of which 16 areas are a Maritime Protected Areas (Du, 2011; MONRE, 2017) (Figure 12).

Table 3: Ecologically sensitive areas should be protected when spill occurs

No	Name of sea area	Province	The title	Effects by shipping
1	Vinh Ha Long	Quang Ninh	WH	Ship enters the port
2	Dao Tran	Quang Ninh	MPA	Close the maritime route
3	Co To	Quang Ninh	MPA	Close the maritime route
4	VQG Bai Tu Long	Quang Ninh	NP	Close the maritime route
5	Cat Ba	Hai Phong	MPA, NP, BR	Ship enters the port
6	Bach Long Vi	Hai Phong	MPA	Close the maritime route
7	Xuan Thuy	Nam Dinh	NP, RS, BR	Close the maritime route
8	Tien Hai	Thai Binh	NP	Close the maritime route
9	Hon Me	Thanh Hoa	MPA	Close the maritime route
10	Con Co	Quang Tri	MPA	Close the maritime route
11	Hai Van-Son Tra	Thua Thien Hue-Da Nang	MPA	Close the maritime route; Ship enters the port
12	Cu Lao Cham	Quang Nam	MPA, BR	Close the maritime route
13	Ly Son	Quang Ngai	MPA	Close the maritime route

No	Name of sea area	Province	The title	Effects by shipping
14	Vinh Nha Trang	Khanh Hoa	MPA	Ship enters the port
15	Nam Yet	Khanh Hoa	MPA	Close the maritime route
16	Nui Chua	Ninh Thuan	MPA	Close the maritime route
17	Hon Cau	Binh Thuan	MPA	Close the maritime route
18	Phu Quy	Binh Thuan	MPA	Close the maritime route
19	Con Dao	Ba Ria - Vung Tau	MPA	Close the maritime route
20	Can Gio	TP Ho Chi Minh	BR	Ship enters the port
21	Ca Mau	Ca Mau	NP, BR	Close the maritime route
22	Phu Quoc	Kien Giang	NP, MPA, BR	Close the maritime route
23	Hoang Sa	Da Nang	MPA	Close the maritime route

(Source: Du, 2011)

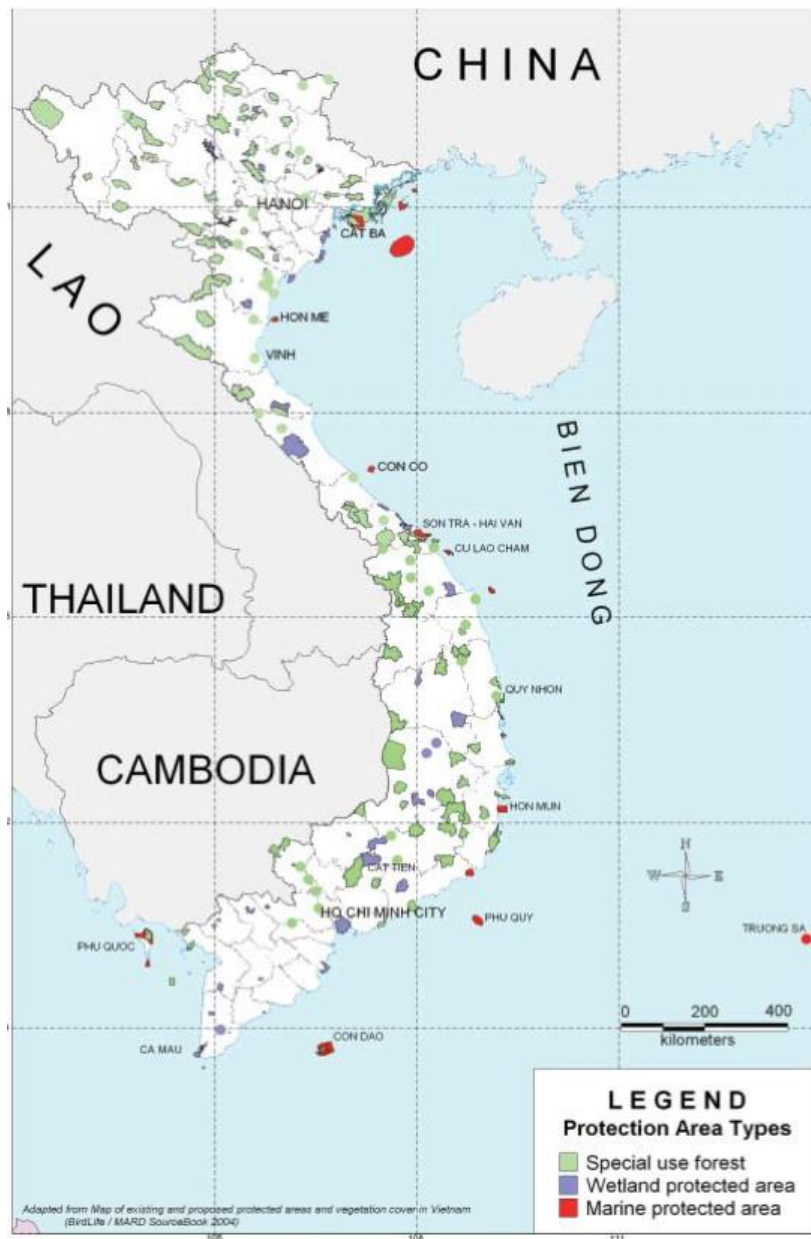


Figure 12: 16 MPAs have been established in Vietnam

(Source: MONRE, 2017)

Based on the spill incident response process specified in Decision no. 02/2013/QĐ-TTg, the local incident response steering committee will designate a qualified unit to conduct environmental quality monitoring and evaluation, in areas affected by the incident. The areas affected and the monitoring location can vary depending on the evolution of the spill. Environmental monitoring data is the basis for assessing the

damage and determining the level of compensation after the incident. Post-response activities include environmental assessment, remediation and problem resolution (Nguyen, n.d.). Specifically, the Steering Committee coordinates with relevant organizations and agencies to assess the extent of damage that affects the environment, socio-economic and human health hazard caused in affected areas. It also includes the impact caused on underground water, soil nutrients, ecosystems, agricultural production, aquaculture and tourism of the particular incident area of the oil spill (VASI, 2017).

Based on the assessed damage, the Steering Committee shall direct the remedial work and prioritize environmental restoration to the original condition. People living within provincial committees shall assume the prime responsibility to coordinate with concerned agencies and means owners (causing oil spills) in evaluating and assessing the damage including setting compensation for damage to life and properties as well as destroyed natural resources of the environment. These agencies should also mobilize human resource, means and equipment to cope with the incidents; such includes surveying, evaluating and identifying damages; resolving the procedures for compensation and overcoming consequences. Finally, the Steering Committee response and relevant parties shall organize an evaluation committee meeting intended to notify the termination of incident response, by adopting appropriate procedures that include summarizing the activities of the division, as well as reporting and terminating the operation of the Steering Committee (VINAMARINE, 2015).

3.2.3. Domestic Legislation and International Agreements

a) Domestic legislation

The Constitution of the Socialist Republic of Vietnam in 2013 contains provisions on the responsibility of environmental protection, which stipulates "organizations and individuals polluting the environment, depleting natural resources and conducting activities which result in biodegradation must be dealt with severely and be responsible for remedying damages" under the Article 63 (VASI, 2017). In addition, Vietnam has gradually, been building and perfecting the legal document system to protect the

marine environment, prevent and respond to oil spills. Some laws and legal documents have specific provisions on surveillance, incident detection, preparation and response to oil spills such a system of laws, codes, and other guiding documents that regulate in relation to environmental protection due to oil pollution (Pham, 2013). For example, some important domestic rules control the activities of oil spill response, such as the Law on Environmental Protection, the Maritime Code amongst others (VASI, 2017).

First, the Environmental Protection Law, 2014, has defined the principle of protecting the environment as “part of the master plan for marine economic development to minimize negative impacts on the marine environment and increase the efficiency of marine industry, thereby, preventing and restricting land-based pollution sources and marine pollution and taking initiative in coordinating and responding to marine environmental incidents” under the Article 52. This law also provides that “organizations and individuals operating in the maritime industry as well as mineral exploitation and exploration, together with means-owners of transporting petrol, oil and chemicals or other toxic substances must have plans, human resources and equipment to prevent and respond to environmental incidents”. On the other hand, rescue and response forces, and marine police forces must be educated, trained and equipped with means and equipment to ensure responding to environmental incidents at sea, according to the Article 56 of the Law on Marine Environment Protection. Henceforth, the Law on Environmental Protection 2014 is considered as one of the important legal documents in the coverage of marine pollution prevention and response to oil-related incidents in Vietnam (MONRE, 2016).

In addition to the Law on Environmental Protection 2014, the Maritime Code 2015 stipulates the stringent obligation to protect the marine environment in marine operations. For example, before Vietnamese ships began operationally, the structure and equipment must comply with Vietnamese laws as well as international treaties to which Vietnam is a contracting party of, in regards to maritime safety, maritime security and the prevention of environmental pollution under the Article 28. Moreover, seagoing vessels operating in port waters and territorial waters of Vietnam must comply with the provisions of Vietnamese laws and international treaties to which

Vietnam is a contracting party, regarding marine navigation safety and environmental pollution prevention. Besides, “exclusive ships for transporting oil, petroleum products or other dangerous goods are required to have civil liability insurance of the ship-owner for environmental pollution when shipping in the seaport waters and Vietnam’s sea” accordance with Article 29 of the Maritime Code. Therefore, according to the Maritime Code of Vietnam in 2015, the compliance with regulations on inspection and prevention of environmental pollution is a compulsory obligation for ships operating in Vietnam’s sea to prevent marine pollution incidents, especially oil pollution. If a ship encounters the defect of environmental protection, its owner and captain have the responsibility to repair or remedy such defects to ensure the maritime safety and environmental protection of the ship. For responding to oil spills, according to Article 54 of the Maritime Code, when the oil spill incidents occur, port authorities are obliged to mobilize people and necessary facilities to respond to oil incidents promptly (VINAMARINE, 2015).

The Petroleum Law of Vietnam amended in 2008 stipulates “organizations and individuals conducting petroleum activities must have environmental protection schemes, apply all measures to prevent pollution, immediately eliminate impacts of pollution and take responsibility to address consequences caused by environmental pollution incidents” under the Article 5. Article 13 of this Law also provides “in the process of conducting petroleum operations, after the end of each stage or the end of oil and gas contracts, the relevant organizations and individuals must remove all permanent works, equipment and facilities in service of oil and gas activities no longer used or restored”. Therefore, the units involved in exploration and exploitation must strictly control the risks and minimize the impact of oil spillage that can cause (Nguyen, 2008).

Vietnam’s legal sub-laws also deal with the prevention and response to oil incidents such as the decision no. 02/2013/QĐ-TTg dated 14/01/2013 issuing a regulation on response activities, which is the most general and important provision on oil spill response up to now (PM, 2013). This rule describes the contents in preparing, responding, overcoming and dealing with the consequences of oil spills as well as the

responsibilities of relevant organizations and individuals for oil spill incidents within their territory and maritime zones of Vietnam (VASI, 2017).

It also specifies the organization of the oil spill incident response, the steps of exchanging and processing information to decentralize the response to spills; the order of assessment of damage, settlement of consequences, compensation for damage caused to organizations and individuals of oil spills, responsibilities of provincial-level committees, relevant ministries, National Committee for Search and Rescue, regional oil spill incident response centers and socio-economic organizations (VASI, 2017; Pham, 2016).

Vietnam's legal documents related to oil spill response are attached in Appendix 3.

b) The international conventions to which Vietnam is a contracting party and bilateral agreements signed

Vietnam is a member of relevant international conventions relating to the prevention of marine pollution caused by oil from ship operations such as UNCLOS 1982, MARPOL 73/78, CLC 92 and BUNKER 1992. These are the legal basis for Vietnam to continue to build domestic regulations to improve the capacity of local oil spill response. For example, UNCLOS provides for the protection and preservation of the marine environment in Section XII with 11 sections and 46 articles (Articles 192 to Article 237) (Nguyen, 2008; Trinh, 2011). Vietnam also promulgated the Law of the Sea in 2012 (Nguyen, 2012).

Bilateral and regional agreements signed between Vietnam and other countries in responding to oil spill pollution includes Joint Statement by Cambodia, Thailand and Vietnam on Spill Response in the Gulf of Thailand, Common Framework for Spill Response in the Gulf of Thailand, and the Agreement Between the Government of the Socialist Republic of Vietnam and the Government of the Republic of the Philippines on Cooperation in the field of Oil Spill Response (Trinh, 2011). Moreover, Vietnam is a member of the Agreement on ASEAN Mutual Cooperation Framework in Preparedness for Spill Response in 2014 (ASEAN, 2014).

To implement these bilateral and multilateral agreements, Vietnam has issued the Prime Minister's Decision no. 1278/QD-TTg dated July 29, 2009 approving the plan for the implementation of the Joint Declaration and the Framework Program between Vietnam, Cambodia and Thailand on Collaborative Response to Oil spill incidents in the Gulf of Thailand, and Decision no. 1864/QD-TTg of the Prime Minister dated October 21, 2011 approving the plan of implementation of the agreement between the Government of the Socialist Republic of Vietnam and the Government of the Republic of the Philippines on cooperation in the field of oil spill incident response (Dao & Nguyen, n.d; Trinh, 2011).

The ratified international conventions and signed legal documents related to oil spill response are listed in Appendix 2.

3.2.4. Equipment, training and exercise

According to the Decision no. 46/2006/QD-TTg of the Prime Minister for the approval of Search and Rescue Plan to 2015, vision for 2020 and the National Oil Spill Response Plan 2001- 2010, three oil spill response centers in the North, Central and South were established. In particular, the government has assigned the Department of Defense to set up two oil spill response centers in the northern and central parts of the Defense Ministry's rescue system; The Ministry of Industry and Trade launched a regional Oil Spill Response Center in the South (Nguyen, n.d.). Currently, the number of staff for each oil spill incident response center is nearly 70 people (VASI, 2017). However, in fact, human resources for running center operations lack for the implementation of monitoring, education, training and efficient response team. The professional qualifications of oil spill response centers in Vietnam's regions are lower than those of other countries within the region, such as Singapore, the Philippines and Malaysia (VASI, 2017). The South Eastern Oil Spill Response Center has a higher professional team than any other center due to the use of trained staff members in the oil and gas sector who have received basic training to cope with oil spills of level 2, as regional level (Nguyen, n.d.).

In addition, there are several private service companies and the responding units of oil and gas industries such as VIETSOVPETRO, Petroleum trading companies (such as B12 Company, Nha Be General Store, PTSC Port, Hai Phong Port), including some enterprises which provide services of oil spill incident response (Dai Minh Co., Salvage Cooperative, Sao Mai Company, Thanh Trung Company (Nguyen, 2012).

Currently, Vietnam has 12 multi-purpose and specialized vessels for oil spill response. In particular, the Northern Oil Spill Response Center has only one vessel, the Central Oil Spill Response Center has two medium-sized ships and the Southern Center contains two large vessels, including specialized and sophisticated equipment such as booms, tanks, vacuums, dispersant, absorber substances, and auxiliary equipment such as oil transfer pumps (Nguyen, n.d.). The SOSRCEM is one of the largest spill response vessels of the Song Thu Company (Ministry of Defense), is considered as one of Southeast Asia's most modern oil spill response vessels (Nguyen, 2012). A list of oil spill response facilities and equipment of regional oil spill response centers is attached in Appendix 4.

As specified in the legal document no. 69/CV-UB of the National Committee of Search and Rescue for “guiding the development and updating of oil spill incident response plans, sensitive maps for coastal provinces and cities” (document no. 69/CV-UB), Vietnam’s 28 coastal provinces and cities must improve their oil spill response plans and equipment in order to promptly respond to incidents occurring within the scope of the region. The top priority for investing or acquiring these facilities must be versatile, highly mobile and suitable for addressing oil spill pollution in local and regional levels (Trinh, 2012). However, the investment in acquiring the equipment between provinces and regions should be for a long-term sustainable use and to enhance synchronism, which is not specifically stipulated in Vietnam (Nguyen, n.d.). These facilities are likely to overlap functions of oil spill response facilities with provincial oil spill response, services or companies, seaports that are related to oil and gas activities (VASI, 2017). For example, Vietnam does not have set criteria for investing in response equipment and facilities across its various oil spill response centers. Furthermore, committees of coastal provinces are required to invest in response

equipment at the regional level; such includes specialized communication equipment for operation of response and recovery, specialized vessels, booms, vehicles and oil storage facilities (Nguyen, n.d.).

Based on the Article 08 of Decision no. 02/2013/QĐ-TTg and Chapter XIV for training, exercises, updating and developing oil spill response plan regulated in the legal document no. 69/CV-UB, 28 coastal provinces and cities must conduct oil spill incident exercises twice a year with their units within the province including Department of Natural Resources and Environment, seaports, oil and gas companies, local port authorities and regional response service companies (VASI, 2017). In addition, the three oil spill response centers must develop training programs once a year for 28 Coastal People's Committees and related units in their respective regions that are managed by relevant authorities to improve their knowledge and capacity to address oil spill incident in accordance with the rules (Pham, 2016).

3.2.5. Finance

Seaports and ship-owners shall be responsible for ensuring the financial implementation of the incident response plan within their operation's scope and shall be liable for the damage caused by the incident. In the case of unidentifiable objects caused by oil spills, Vietnam's budget shall pay all the temporarily paid amounts for the response activities mobilized by the relevant agencies (Nguyen, n.d.). The specialized or provincial response forces are owned by the Ministries, local administration that will be operated and funded by funds allocated to these units (VASI, 2017).

In regards to the investment of equipment for coastal provinces, the provincial People's Committees allocates cost estimates of response equipment within a time between 0 to 5 years. However, these funds are sourced from the coastal province's budget. In case of emergency response, the government will provide the financial capacity for oil spill response, search and rescue, fire protection and other monitoring (Nguyen, n.d.). These emergencies funding are sourced from the Vietnam's Compensation and Environment Funds; wherein at the end of incident, the polluter is charged with responsibility for

compensation of environmental damaged caused by the oil spill. If the contamination has not yet been identified and a monetary value for the damage is yet to be evaluated, then, the State budget will be used to pay for these activities (PM, 2013). Furthermore, as a standard requirement, all seaports must equip their ports with rescue facilities and have adequate funds to pay for local response forces. Although funding for oil spill response has been systematically established in Vietnam in accordance with Decision no. 02/2013/QD-TTg of the Prime Minister, overcoming the consequences of the oil spill and recovering the environment after the incident is insufficient (Trinh, 2011; MONRE, 2016).

CHAPTER 4 - THE IMPACTS OF RATIFYING AND IMPLEMENTING OPRC TO VIETNAM

4.1. Arising rights and obligations of Vietnam

According to the Article 3 of OPRC for Oil Pollution Emergency Plans, Vietnam meets the legal criteria set out in this Article, but it is necessary to improve the effectiveness of other domestic legal instruments (Pham, 2016). For example, after ratifying MARPOL Convention, Vietnam has issued Circular no. 23/2010/TT-BGTVT dated 28/08/2010 for the National Technical Regulation on Marine Pollution Prevention Systems of Ships. As a standard requirement, the system, structure and equipment of the vessel must ensure that it prevents marine pollution in accordance with the provisions of Regulation 37 of Annex I, MARPOL Convention. However, Port State Control for ships are not conducted properly; rather there is more emphasis on the main seaports, such as Hai Phong, Quang Ninh, Ho Chi Minh, Ba Ria - Vung Tau seaports (VINAMARINE, 2015).

For coastal cities and provinces, Vietnam has 28 coastal provinces which are required to develop oil spill incident response plans, to be regulated and developed in accordance with the legal document no. 69/CV-UB of the National Committee of Search and Rescue (Trinh, 2011). On the other hand, the Law on Environmental Protection, the Petroleum Law of 2008 Act amendment and the Maritime Code stipulates that organizations and individuals in the maritime field or related areas such as oil and gas exploration activities must take appropriate measures to observe environmental protection regulations and efficiently respond to marine environmental incidents, as well as maintaining close collaboration with competent agencies incident response teams /service providers, such as oil and gas incident vessels, offshore platforms, seaports and oil transshipment terminal (Pollution Control Department, 2012).

In addition, Chapter 3 of this dissertation discussed - organizing response to oil spills in regards to Decision no. 02/2013/QĐ-TTg of the Prime Minister, which provided an overview of the reporting procedures, actions to be taken when receiving notification

of oil pollution and appropriate resources allocation for each level in accordance with Article 4 & 5 of the OPRC Convention (Pham, 2016). Furthermore, Circular no. 34/2015/TT-BGTVT of the Ministry of Transport, also provides relevant details on procedures required for reporting and investigating maritime incidents (VINAMARINE, 2015). However, because Vietnam is yet to invest in oil spill monitoring and detection equipment, there are more difficulties faced in assessing the impact of the incident and synthesis of databases on how to respond to and address the consequences of the oil spill, which has resulted in untimely and ineffective response to oil spill incident (Pham, 2016).

According to Articles 6, 7 and 10 of the OPRC on national and regional systems, international cooperation, and promotion of bilateral and multilateral response and preparedness, Vietnam fulfills all the requirements mentioned in Section 3.2.3. Vietnam has regulated this issue in Articles 20 and 21 of the Decision no. 02/2013/QĐ-TTg on international coordination in coping with oil spills. Therefore, Vietnam should strengthen its regional cooperation with neighboring countries such as Thailand, Cambodia, Malaysia and the Philippines through signed bilateral or multilateral cooperative arrangements because Vietnam has limited experience and capacity to cope with over 500 tons classified as a large oil spill even at the national level (Dao & Nguyen, n.d.).

In order to address this challenge, Vietnam's proactive management approach has been, to encourage investment from competent private companies and international organizations to effectively and efficiently respond to large-scale oil spill incidents. Moreover, this approach has helped to reduce financial pressures on national oil spill response centers, but the cost of training and procuring equipment is still a major challenge faced by Vietnam's government (Nguyen, n.d.).

As Articles 8 and 9 relating to the technical research, development and cooperation, although Vietnam is not a member of the OPRC, Vietnam has been supported to train staffs and develop joint research and programs in oil spill response by the assistance of the IMO, the Korean Government and ASEAN for Institutes of Science, Technology

and Environment. Research and development of techniques and equipment to minimize the impact of environmental pollution as well as to respond to oil incidents is provided in Article 152 of the Law on Environmental Protection. Due to financial constraints, Vietnam has no specific funding mechanism and budget for technical development and equipment to cope with oil pollution. Petroleum corporations and people's committees are main investors of this activity (VASI, 2017).

The legal documents of Vietnam in Section 3.2.3 show that Vietnam is very concerned the preparedness and response to oil spills. However, at present, only Decision no. 02/2013/QĐ-TTg is a legal specialized document to regulate marine oil pollution response, which fully regulates the responsibilities of the relevant agencies and the detail process of oil spill response. Furthermore, the legal documents for marine pollution prevention and accident investigation are controlled by government agencies such as the MOT, MONRE and National Committee for Search and Rescue. As a result, Vietnamese legal documents are in line with the principles and regulations of the Convention, but it is necessary to issue specific rules and budget for development of oil spill response technology and equipment in Vietnam.

4.1.1. Rights

As being a Party of the OPRC Convention, gives Vietnam the following fundamental rights and responsibilities:

- Responsibility to report any incident/event occurring offshore as it relates to oil spills or potential oil spills that may affect national interests;
- Cooperation and technical support from others member states that are parties to the Convention, in assisting or providing consultancy, technical assistance including equipment and personnel so as to respond to oil pollution/spillage promptly and adequately. In so doing, it will limit or minimize the impact of oil spill incidents and prevent environmental hazards;
- Promote technical cooperation amongst member states on how to share experience and best practice in regards to oil spills incident preparedness and response;

- Ensure efficient and effective reporting of oil spill related events from offshore vessels including oil spill reports from member states of sovereign nations; and
- Exchange and harmonization of information between member states on scientific activities, marine science and technology programs as well as monitoring and evaluation programs that are in relation to oil spill incident response (Trinh, 2011).

4.1.2. Obligations

The requirements set out in the OPRC Convention requires several commitment from Vietnam both at national and international levels with regards to implementation.

a) Obligations in the national level

- Vietnam is obligated to promulgate legal documents, in preparedness and cooperation on how to respond in addressing oil spill incidents as required in the provisions set out in the OPRC Convention;
- Vietnam must also designate competent authorities that should be responsible for organizing response for oil spill incidents, which shall also include lead agencies and related organizations that are responsible for managing the response. Presently, Vietnam has assigned the National Committee for Search and Rescue and the Ministry of Natural Resources and Environment as stipulated in Decision no. 02/2013/QĐ-TTg of the Prime Minister, shown in Part 3.2 (VASI, 2017);
- Vietnam has also developed Circular no. 23/2010/TT-BGTVT of Ministry of Transport on the implementation of emergency plans to deal with oil spill incident in accordance with Regulation 37, Annex I, MARPOL Convention. The purpose of the response is to minimize the impact of the incident on the environment, to promptly respond to oil spill incidents and strengthen the communication and coordination between relevant agencies, as well as to strengthen measures that protect the marine environment from the impact of oil spills (VINAMARINE, 2015);
- Vietnam should develop more robust management reporting system for incidents taken place within its territorial waters or national jurisdictions, such as 03 reports. The initial pollution reports are made at an early stage, when the oil spills are firstly

discovered. Secondly, the Pollution report is intended to update the reoccurrence of incidents periodically. The final report is at the end of the oil spill response process. These reports are submitted by Vietnam government and incorporated into Decision no. 02/2013/QĐ-TTg and which is in line with the provisions of Article 5 of the OPRC (VASI, 2017).

b) Obligations in the international level

- Parties to the Convention have the responsibility to report to neighboring countries on detected oil spills that are likely to affect other neighboring countries;
- Required to support neighboring countries affected by oil spills upon request, with human resource, facilities and equipment for oil spills incident response. For example, the party which received the request must instantly confirm and render relevant assistance, and in so doing both parties shall maintain steady communication and exchange of information so as to cope with the incident. Moreover, parties or member states depending on their financial or technical capacity shall assist other parties in addressing and coping with oil pollution incidents;
- The recipient member state, upon receiving assistance from another state must consider exemptions of documentation requirements for entry procedures of personnel, facilities and equipment across borders in an event of emergency, in order to respond promptly (Nguyen, 2008; Trinh, 2011).

4.2. Assessment of Vietnam's capacity building to meet the requirements of OPRC

According to the assessment in the section 4.1., the Vietnam's legal documents for environmental protection and response to oil pollution incidents are in line with the provisions set out in the OPRC Convention. For example, Vietnamese ships are mandated to carry on board their vessels, oil pollution incident response plans approved by Vietnam Maritime Administration and the Vietnam Register, as described in Circular no. 23/2010/TT-BGTVT of Ministry of Transport and in accordance with Article 37 of MARPOL Convention and Article 3 of the OPRC Convention. These rulings or regulations increases the responsibility of ship-owners to be more aware of

their responsibilities in preparing and adequately responding to oil spills as well as protecting the marine environment from oil pollution (VINAMARINE, 2015). The standard requirements for response equipment are required in the approved oil spill response plan, so ships would not have to invest in additional equipment or incur additional cost (Trinh, 2011; VINAMARINE, 2015).

In addition, Vietnam has clearly defined the mandates of relevant agencies such as the National Search and Rescue Committee as the lead agency and the national focal point in responding to oil spills as the Ministry of Natural Resources and Environment (MONRE), which is responsible for managing the preparation and response to oil spill incident at sea (Prime Minister, 2013). However, the Ministry of Transport is also responsible for enforcing and developing maritime regulations including comprehensive management national plans for emergency marine pollution and is the national focal point of contact with IMO (VASI, 2017).

Vietnam has also built a system of coastal communication stations with wide coverage through which communications focal points are easily contacted by vessels, organizations and individuals involved in offshore oil exploration and exploitation. It helps to monitor, share information, respond promptly upon request and provide cooperation in responding to oil spills incident (VINAMARINE, 2015). Moreover, exchanging and sharing of information cooperation responses with ASEAN countries is limited due to overlapping functions and responsibilities of Vietnam's oil spill incident management agencies. For example, the Ministry of Natural Resources and Environment has the primary responsibility for managing information on monitoring and response to environmental incidents in Vietnam's coastal waters. On the other hand, the information related to rescue and search belongs to the Ministry of Transportation and the National Committee for Search and Rescue (Pham, 2016). Although, presently, maritime and environmental management agencies are adequately addressing oil spills at the local and regional levels with the available resources listed in section 3.2, the ratification of the convention does not incur any additional costs (Nguyen, n.d.).

Based on the existing resources, capabilities and assessments, Vietnam meets all the requirements of the OPRC Convention. Vietnam also needs to develop a national plan that aim at reducing restrictive measures on entry procedures in order to allow personnel and equipment into the country so as to assist member countries in the region when required. Vietnam should also strengthen the national disaster preparedness, response and coordination processes through regular exercises. The OPRC ratification is in line with the trend of the world's maritime industry and the processes of international economic integration, thereby enhancing the position of Vietnam in the shipping sector within regions and the world at large (Pham, 2016; VASI, 2017).

CHAPTER 5 - THE BARRIERS, CHALLENGES AND OPPORTUNITY IN VIETNAM FOR RATIFYING AND IMPLEMENTING OPRC

5.1. Barriers and challenges

5.1.1. Oil spill response model

The International Maritime Organization (IMO) and other countries around the world generally, have considered prevention and responses to marine environmental pollution (oil spills) as part of maritime safety and marine environmental protection issues with much emphasis on ships as the primary source of the oil spills. The cause of marine oil spills is mainly from ships (such includes drilling rigs, floating depots, fixed and movable marine works) (AMSA, n.d.; IMO, 2011). In addition, activities to respond to marine environmental incidents are carried out by the ship, including self-response activities at the seaports in case of incident or incident in other maritime related fields (IMO, 2011). As a result, specialized maritime agencies are always involved in ensuring the safety and protection of the marine environment, which includes prevention and response to marine environmental incidents and oil spills (Mai, 2013).

Depending on the organizational structure of each country, the agencies or task forces that assume the prime responsibility for undertaking activities to respond to marine environmental incidents or oil spills may be under the Ministry of Transport or the Ministry of Defense (Mai, 2013). These agencies have competent authority under the ministry to control national maritime activities and are also responsible to develop Vietnam's maritime regulations and ensure maritime safety and protection of the marine environment. Furthermore, international treaties and regulations on prevention and response to marine environmental incidents which are issued by the IMO and national maritime authorities, such as international treaties and national maritime regulations shall be enforced by those agencies (VASI, 2017). Similarly, the National Focal Point model in the world and ASEAN countries as it relates to the implementation of international treaties and cooperation on the prevention, preparedness and response to oil spills are the Ministry of Transport or Coast Guard,

which is under the Ministry of Defense (ASEAN, n.d.). These ministries are responsible for coordinating and implementing maritime regulations, which includes management and control of vessels, mobilization of ships and boats, search and rescue operations as well as the procurement of equipment used to respond to accidents, incidents at sea and marine chemical spills. For example, Singapore's main oil spill response agency is the Maritime and Port Authority of Singapore (MPA) that is under the Ministry of Transport (SEA ALARM, 2009). Another example, is the Philippines, with two major agencies involved in coping with oil spills, they include the Philippine's Maritime Authority and the Philippine Coast Guard which is under the Ministry of Defense and the Ministry of Transport, respectively (Parker et al., 2009).

5.1.2. Collaborative work to implement response

According to the Vietnam's Maritime Code, all search and rescue centers and local maritime administrations shall have the power to mobilize people and carry out search and rescue activities or remedy environmental pollution incidents, such as responses to oil spills and toxic chemicals on the marine environment. Directors of local maritime administration have also been given the authority by appropriate ministries to inspect, seize and arrest seagoing vessels that are in violations, as set out in the regulations of the Maritime Code. These agencies are under the authority of Vietnam Maritime Administration and the Ministry of Transport (MOT) (VINAMARINE, 2015). Thus, in the event of a serious incident at sea within the national jurisdiction or beyond; the coordination, sharing of information, maneuvering of vessels and procurement of marine equipment that is coordinated between international focal persons and the local maritime authorities are controlled by the MOT. They also provide 24/7 operational support service wherein the language could also be translated in English. This service has proven to be very effective due to the compatibility with the model, expertise in maritime managements or related fields and control of ships at sea. Furthermore, the service is more effective and efficient in responding to oil spill incident than other units that lack expertise in specialized maritime fields (VASI, 2017).

In addition, the National Focal Point for Oil Spill Response is the National Search and Rescue Committee, which is a group composed of representatives from relevant Ministries such as Ministry of Natural Resources and Environment (MONRE), Ministry of Transport (MOT), Ministry of Agriculture and Rural Development, Ministry of Public Security and other agencies. However, it needs to inform or communicate with members of the participating agencies when incidents occur.

According to Decision no. 02/2013/QĐ-TTg of the Prime Minister, the lead agencies for the oil spill response organization are the National Committee for Search and Rescue and the Ministry of Natural Resources and Environment, which are responsible for the mobilization, coordination and procurement of equipment for responding to subdivisions and units under the Ministry of Transport. These lead agencies are also responsible for the sharing and exchange of information between regional and international maritime agencies, which is yet to be effective (Prime Minister, 2013). On the other hand, the exchange of information and cooperation between specialized bodies such as MOT and MONRE is not as effective as the exchange of information and cooperation between the Ministry of Transport and the Ministry of Transport's subordinate bodies (VASI, 2017). This ineffective cooperation and information sharing between Vietnam's maritime agencies, has been attributed to the delay in Vietnam becoming a contracting party of OPRC convention. Therefore, Vietnam should assign specific responsibilities for preparedness, response and coordination between MONRE and MOT in addressing oil spill incident. In addition, Vietnam should also nominate appropriate specialized units in line with international specialized maritime fields, capacities and practices to deal with oil spills and implement the OPRC Convention.

Other difficulties faced by Vietnam are financial constraints for oil spill response and compensation for environmental or social damages incurred by the oil spill. Due to the inappropriate allocation of funds to oil spill incident control units, investment and distribution of equipment and facilities have been misappropriated, causing waste to the state budget (Nguyen, n.d.). Vietnam national legislation does not provide provisions for the settlement and compensation of damages caused by pollution from

international shipping organizations and vessels. Hence, Vietnam should develop regulations for long-term investment in equipment within the 28 coastal provinces, and also review and improve upon existing policies and formulate regulations that address compensation for oil spill contamination in accordance with CLC 1992 (Pham, 2016).

5.1.3. The current capacity of the specialized agencies in the proposed study of maritime conventions

Vietnam Maritime Administration (VINAMARINE) is a government agency under the Ministry of Transport (MOT), which functions in advising and assisting MOT in managing and controlling the maritime industry. It is also responsible for signing international maritime convention of the IMO such as the OPRC Convention.

VINAMARINE has conducted several proposal projects to ratify and to implement the IMO's treaties successfully in recent year including MARPOL, Anti-fouling system (AFS) and BUNKER Conventions, etc. However, this work has been challenged by limited human and financial resources. In fact, only three marine environmental experts are working at VINAMARINE and funding resource for study in maritime field is irregular and inadequate. Funding for survey and collection of environmental samples at seaports for research is quite insufficient for six of 44 seaports. Moreover, some environmental staff employed by the local maritime administrations, are faced with difficulties and delays in conducting research and in implementing international regulations (VINAMARINE, 2012).

5.2. The effectiveness of the ratification and implementation of the OPRC Convention in Vietnam: A SWOT (Strengths, Weaknesses, Opportunities and Threats) Analysis

Based on the current capacity of Vietnam and impact assessments of the ratification and implementation in Vietnam, this section will point out a SWOT analysis on key issues/focus areas such as governance, ecological and socio-economic impacts criteria that Vietnam needs to fulfill. Table 4 performs the major strengths, weaknesses, opportunities and threats of current and future capacity building in the relevant issues of Vietnam to ratify and implement the OPRC Convention.

Table 4: The major issues of the strengths, weaknesses, opportunities and threats to ratify and implement OPRC Convention in Vietnam

Strengths	Weaknesses
<ul style="list-style-type: none"> • Existing legal framework for oil spill response in Vietnam • Available resources to respond to oil spills (equipment, human resources, finance) • Personnel of relevant government agencies is trained to conduct annual oil spill response training exercises which include regional committees, local maritime administrations and seaports • 28 coastal provinces in Vietnam are in the process developing oil spill response plans • Signed some bilateral and multilateral cooperation in the area; ratified many relevant international conventions in the maritime field dealing with oil spill incident response 	<ul style="list-style-type: none"> • Non-existing regulations on procedures for transporting equipment, facilities and persons to coordinate response between member states. • Inability to resolve conflicts over the management of oil spill incident response between MOT and MONRE, and the National Committee for Search and Rescue. • Lack of technical, financial and human resources and limitations in management capacity of maritime agencies • Lack specific criteria for investment in equipment in at all maritime managerial levels • Lack of mechanisms and resources for monitoring and detecting marine environmental incidents
Opportunities	Threats
<ul style="list-style-type: none"> • The establishment of the search and rescue program in Vietnam • Effective communication and exchange of experience between oil spill centers of Vietnam, ASEAN and international organization. • Enhanced cooperation on technology transfer and oil spill response pages with member countries of the convention • Development the regional search and rescue centers under the management of the Ministry of Transport 	<ul style="list-style-type: none"> • Financial constraints for long term investment in equipment and training of human resources for oil spill response • Increasingly high rate of pollution and natural disasters in Vietnam • Impact from climate change and sea level rise • Potential oil spill risk from increased in the shipping activities in Vietnam's seaports and seas

(Source: Trinh, 2011; Nguyen, n.d.)

Oil spills risks are often borne out by human factors resulting in several challenges to addressing prevention and mitigation of its impact on the environment. Moreover, oil

spilled is not only caused by shipping activities and offshore petroleum operation, but is also influenced by climate change and natural phenomena. Therefore, all relevant organizations and ship owners should be required to have an emergency response action plan including preparedness of response capabilities in readiness to minimize the impact of oil spills to the environment (MONRE, 2016).

Upon ratification of the OPRC Convention, Vietnam may have benefits, both directly and indirectly, in terms of socio-economic, environmental, natural resources and ecology. Firstly, the economic, social and environmental benefits shall minimize the impact of oil spills to the economy and environment, through exchange of information and cooperation in response to oil spills amongst the member states. Secondly, Vietnam shall have easy access to technical services and human resources in the event of oil spills occurrence with the assistance of member states. The other benefits shall include the reduction of investment in equipment, which shall be achieved by sharing oil spill incident response services and the reduction of staff training cost, and reduced entry requirements and procedures into territorial borders particularly for oil spill response team who are rendering assistance from other member states. For instance, as a member State of the OPRC Convention or any oil spill response bilateral agreement, transportation of equipment, movements of ships or aircraft to and from other countries that are members shall be facilitated. As a result, entry procedure will be reduced or lessened to increase the effectiveness of the oil spill response process (Trinh, 2011).

In accordance with Article 8 of the OPRC Convention, Vietnam and other member states must intensify research and technology in oil spill response and recovery. The research results obtained could be shared amongst members' states. The results could provide information on improved technology and technical monitoring, containment, recovery, dispersion, and minimize or mitigate effects of oil pollution (IMO, n.d.). These scientific and technological exchanges could help to establish relationships among related oil spill research organizations/institutions (IMO, n.d; Warner, 2015).

Although Vietnam has a legal framework, equipment and human resources for coping with oil spills, it needs to strengthen the necessary specialized knowledge and skills, as well as for training and exercises for relevant government agencies, individuals and organizations (Pålsson, 2016; VASI, 2017). The ratification of the Convention helps to address the challenges in oil spill preparedness and response including its reporting, monitoring, cooperation, exchange of technical experience with other countries, and ensures the protection of the marine environment to be consistent with the global trend of the maritime industry as well as including the continuous improvement in the role of Vietnam's maritime industry (VINAMARINE, 2015; VASI, 2017).

CHAPTER 6 - CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

Due to rapid economic growth, the number of foreign ships arriving in Vietnam's ports has been increasingly high and the expansion of offshore oil and gas exploration and exploitation activity in the Southeast Asia region that has led to a high risk of pollution in the seas and seaports of Vietnam. This requires state agencies, oil and gas facilities and vessels operating in the sovereignty of Vietnam to improve their ability to prepare for oil spill incident response. Therefore, the role of the Vietnam government is very important, in enhancing the legal framework within the national and regional context in accordance with set requirements in international treaties.

Vietnam is party to the Memorandum of Understanding (MOU) on ASEAN Mutual Cooperation Framework for Oil Spill response preparedness and cooperation in response to flooding among ASEAN countries, it is shown that ratification of international conventions and signing of regional agreements have provided positive effects in the process of environmental protection from pollution caused by ships and offshore oil and gas activities. Therefore, in order to effectively integrate and implement the OPRC, it is necessary to have close coordination between the state's agencies on safety and protection of the marine environment and the integrated management of natural resources, sea and islands. In particular, the re-assignment of functions and tasks of the Ministry of Transport (MOT) and the Ministry of Natural Resources and Environment (MONRE) are discussed clearly as follows:

MOT performs the functions and tasks of implementing state management on safety and protection of the maritime environment (including the tasks involved in preventing and responding to marine environmental incidents and oil spills), ships (drilling platforms, fixed or mobile floating depots), ports (offshore port, marine building, equipment and marine pipelines) and officers, crew members. Moreover, it to solicit additional of funding which will assist in the development of human resource capacity so as to conduct research studies in proposed ratification of an international maritime conventions.

On the other hand, MONRE performs the functions and tasks of implementing state management of environmental protection and integrated management of natural resources and environmental protection of the sea and islands. This means that MONRE implements state management of marine environmental protection. In addition, MONRE must coordinate with MOT, which is the focal point in coordinating with IMO and leading agencies to implement international maritime agreements in Vietnam, including Memorandum of Understanding on ASEAN Mutual Cooperation Framework for Oil Spill Response Preparedness. The Ministry of Transport as the lead agency in responding to oil spill incidents, supports and creates favorable conditions for standardized process towards the completion procedures of the Prime Minister to ratify the OPRC Convention in Vietnam, as well as the upcoming OPRC-HNS Protocol which aims to improve Vietnam's capability in oil spill preparedness and response including international coordination with regional countries.

In respect of the current status and existing challenges, the ratification of the Convention indicates that Vietnam shall be ready to integrate and adapt to the development of recent global trend within the maritime industry such as the compliance of the legislation, organizational structure, and equipment. It also considers international maritime provisions and best practices as well as requirements set out in OPRC Convention.

6.2. Proposed roadmap to ratify and implement the OPRC in Vietnam

In order to effectively implement the Convention after accession and to improve its capacity to respond to oil spills, the roadmap for ratification and implementation of OPRC and some proposed measures are discussed, as follows.

Based upon the government decisions on the Ministry of Transport as the lead agency for research and coordination with relevant parties to accede to the OPRC Convention; shall comply with the procedure to accede and implement International Treaties of Law no. 108/2016/QH13. The content of the project will be reviewed by Vietnam maritime administration to seek consultation from relevant experts and organizations in the maritime field, which shall consolidate the content before submitting to the

Ministry of Transport and the Government to consider ratifying the Convention in 2019.

The content of the project approved by the Ministry of Transport will be on the basis for further consultation with relevant agencies, such include: National Committee for Search and Rescue, Ministry of Natural Resources and Environment, Ministry of Agriculture and Rural Development, Ministry of Defense, Ministry of Justice, Ministry of Foreign Affairs, Ministry of Industry and Trade and other relevant agencies. Expected time for receiving suggestions and recommendations in regards to the project from the various ministries in Vietnam is slated for June 2019 to August 2019.

Based on the comments of the relevant agencies, Vietnam maritime administration will finalize the project to submit to the Prime Minister for consideration and final decision on the expected date, September 2019.

From October 2019 to November 2019, Vietnam will adopt procedures acceding to the convention from IMO after being approved by the Prime Minister. These procedures will be conducted through diplomatic channels (through the Ministry of Foreign Affairs) by submitting the instrument for ratification of the Convention to the Secretary General of the IMO.

While awaiting the official IMO approval for Vietnam to become a member of the convention between November 2019 and February 2020, the Ministry of Transport will continue to coordinate with the specialized ministries and agencies concerned to prepare and implement plans of the OPRC Convention, such as:

- Synthesizing and reviewing amendments and promulgation of legal documents, norms and technical agreement in the maritime field, which are concerned with monitoring, risk assessment, response, recovering, criterion of equipment investment for all levels and addressing the consequences of marine oil spills in accordance with the provisions of the OPRC Convention;

- Study and formulate regulations to reduce the immigration procedures and entry of equipment for the parties of the convention used to support and assist response of oil spills incidents;
- Conduct research and develop specific criterion for the investment of oil spill response equipment, facilities and allocate budget for annual exercises of oil spill response centers at all levels;
- Study and propose measures to promote and facilitate scientific and technical research on oil spill response systems and equipment and also establish an integrated investment data center to improve oil spill monitoring and national oil spill response coordination in Vietnam;
- Training, education, information dissemination, raising public awareness on environmental protection, handling and responding to oil spill incident response in order to improve the capabilities and skills of handling the incident situations. Furthermore, strengthening the coordination between domestic agencies and international organizations. The propaganda and training should be implemented after the implementation plan of the OPRC Convention approved by the Prime Minister, to be integrated into the training programs of the specialized management agencies with funding from the Vietnam's government regular operating budget and the Technical Cooperation Program of the IMO. Therefore, this activity will not require additional funding from the state budget.

REFERENCES

- AMSA. (n.d.). Oil Spills in the Australian Marine Environment: Environmental Consequences and Response Technologies. Retrieved 2017, from <https://www.amsa.gov.au/forms-and-publications/environment/publications/NP-Reports/documents/Oil-Spills-in-ME.pdf>
- ASEAN. (2014). *Memorandum of Understanding on ASEAN Cooperation Mechanism for Joint Oil Spill Preparedness and Response*. Retrieved from http://asean.org/wp-content/uploads/images/pdf/2014_upload/MOU%20on%20ASEAN%20OSRAP.pdf
- ASEAN. (n.d.). About ASEAN - ASEAN | ONE VISION ONE IDENTITY ONE COMMUNITY. Retrieved from <http://asean.org/asean/about-asean/>
- ASEAN. (n.d.). *ASEAN Regional Plan of Cooperation under the Memorandum of Understanding on ASEAN Cooperation Mechanism for Joint Oil Spill Preparedness and Response*.
- Binh Dinh Province Portal (BDPP). (2013, July 31). Oil Spill in Quy Nhon, Binh Dinh. Retrieved from <http://www.binhdinh.gov.vn/inetcloud/portal/main/page/gov/chitietdanhmuc.i vt?intl=vi&id=539036d3c45ad581471d4c3a>
- Clifton, A. (2014). *Oil Spills: Environmental Issues, Prevention and Ecological Impacts*. Hauppauge, New York: Nova Science Publishers, Inc.
- Dao, H. V., & Nguyen, M. T. (n.d.). Collaborative response to oil spills in the Gulf of Thailand: Results and orientation. Retrieved 2017, from http://www.vasi.gov.vn/uploaded/8/654_HOP_TAC_UNG_PHO_SU_CO_T RAN_DAU_VUNG_VINH_THAI_LAN.pdf
- Department of Foreign Affairs of the Philippines. (2010). Memorandum of Agreement between the Government of the Republic of the Philippines and the Government of Socialist Republic of Vietnam on Cooperation in Oil Spill Preparedness and Response. Retrieved from <http://210.5.104.56/treaty/scanneddocs/549.pdf>
- Department of Natural Resources and Environment of Quang Binh. (2011). *Report on the current state of the environment in Quang Binh from 2005-2010* (Rep.). Quang Binh: Provincial People's Committee.
- Du, T. V. (2011). *Determination of Particularly Sensitive Sea Areas (PSSA) in the Vietnamese Sea Region, Applicable To the Quang Ninh Sea - Hai Phong Seaports* (Rep.). Hanoi: MONRE
- ECOLEX. (n.d.). International Convention on Oil Pollution Preparedness, Response and Co-operation. Retrieved 2017, from

- <https://www.ecolex.org/details/treaty/international-convention-on-oil-pollution-preparedness-response-and-co-operation-tre-001109/>
- GESAMP. (2007). Reports and Studies 75: Estimates of Oil Entering the Marine Environment from Sea-based activities. Retrieved from http://www.gesamp.org/data/gesamp/files/media/Publications/Reports_and_studies_75/gallery_1042/object_1042_large.pdf
- Guevarra, J. (2015). Global Initiative for Southeast Asia: The Journey Towards Regional Cooperation in Oil Spill Preparedness and Response in ASEAN. Retrieved 2017, from <http://www.interspill.org/previous-events/2015/WhitePapers/Interspill2015ConferenceProceedings/25%20MAR%202015/IMO-IPIECA%20Global%20Initiative/Global-Initiative-for-Southeast-Asia.pdf>
- Energy Information Administration (EIA). (2013). The South China Sea is an important world energy trade route. Retrieved 2017, from <https://www.eia.gov/todayinenergy/detail.php?id=10671>
- Hochschule Bremen University of Applied Sciences, Can Tho University, Hanoi University of Science, Max Planck Institute for Marine Microbiology, University of Technology, Germany, University of Wales, UK, . . . Petro Vietnam Drilling and Well Service Company. (2006). *The Risks and Consequences of Oil Pollution in Vietnam & Guidelines on Bioremediation of Oil Spills*. Retrieved from http://homepages.hs-bremen.de/~office-ikrw/biorem/Download/Handbook_BIOREM%201.0.pdf
- Institute of Oceanography (VNIO). (2011). *The situation of oil pollution in the sea in Vietnam*. Hanoi, Vietnam: Science and Technology Publishing House.
- IMO. (2017). Status of Conventions. Retrieved from <http://www.imo.org/en/About/Conventions/StatusOfConventions/Pages/Default.aspx>
- IMO. (n.d.). International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC). Retrieved 2016, from [http://www.imo.org/en/About/conventions/listofconventions/pages/international-convention-on-oil-pollution-preparedness,-response-and-co-operation-\(OPRC\).aspx](http://www.imo.org/en/About/conventions/listofconventions/pages/international-convention-on-oil-pollution-preparedness,-response-and-co-operation-(OPRC).aspx)
- ITOPF. (2014, May 19). TIP 13: Effects of oil pollution on the marine environment. Retrieved from <http://www.itopf.com/knowledge-resources/documents-guides/document/tip-13-effects-of-oil-pollution-on-the-marine-environment/>
- ITOPF. (n.d.). Documents & Guides about marine spills, response and compensation matters. Retrieved from <http://www.itopf.com/knowledge-resources/documents-guides/>
- Khac, H. (2010). Combating Oil Spills in Vietnam. Retrieved 2017, from <https://www.vietnambreakingnews.com/2010/06/combating-oil-spills-in-vietnam/>

- Ma, S. (2016). *Maritime Economics* (2016). Malmo: World Maritime University.
- Mai, D. H. (2013, May 08). International and foreign regulations in oil pollution from ships. Retrieved from <http://luanan.nlv.gov.vn/luanan?a=d&d=TTcFqWrKfgHO2013.1.8&srpos=3&e=-----vi-20--1--img-txIN-d%E1%BA%A7u----->
- Mai, H. (n.d.). Strategic location of the South China Sea. Retrieved 2017, from <http://tcdcl.moj.gov.vn/qt/tintuc/Pages/xay-dung-phap-luat.aspx?ItemID=83>
- Mapsofworld. (n.d.). Map of Vietnam, Vietnam Map. Retrieved 2017, from <https://www.mapsofworld.com/vietnam/>
- Mapsofworld. (n.d.). Singapore Map. Retrieved 2017, from <https://www.mapsofworld.com/singapore/>
- Marine Environment Survey and Control Department (MESCD). (2013). Retrieved 2017, from <http://www.quangninh.gov.vn/vi-VN/so/sotainguyenmt/Lists/Danh%20sch%20cc%20bi%20vit%20tin%20tc%20v%20s%20kin/Attachments/274/KH%20KSON%20QNinh.pdf>
- Maritime and Port Authority of Singapore (MPA). (2016). MPA to Test New Procedure for Oil Spill Clean Ups in Multi-Agency Joint Oil Spill Exercise - JOSE. Retrieved 2017, from <http://www.mpa.gov.sg/web/portal/home/media-centre/news-releases/detail/529ac923-0cce-4f21-8155-f2401b7551b7>
- Maritime and Port Authority of Singapore (MPA). (n.d.). Port Statistics. Retrieved 2017, from <http://www.mpa.gov.sg/web/portal/home/port-of-singapore/port-statistics>
- McKinnon, A. (2011). *Hong Kong And Singapore Ports: Challenges, Opportunities and Global Competitiveness* (Working paper). Hong Kong. Retrieved 2017, from [http://www.cityu.edu.hk/slw/HKCMT/Doc/Working_Paper_1_-_Singapore_-_Final_\(v12\).pdf](http://www.cityu.edu.hk/slw/HKCMT/Doc/Working_Paper_1_-_Singapore_-_Final_(v12).pdf)
- Ministry of Natural Resources and Environment (MONRE). (2016). Environmental Status Report of Vietnam in period 2011 - 2015. Retrieved 2017, from <http://tcmt.monre.gov.vn/pages/article.aspx?item=B%C3%A1o-c%C3%A1o-hi%E1%BB%87n-tr%E1%BA%A1ng-m%C3%B4i-tr%E1%BB%9Dng-qu%E1%BB%91c-gia-giai-%C4%91o%E1%BA%A1n-2011---2015-42030>
- Moller, T. H., & Santner, R. S. (1997). Oil Spill Preparedness and Response: The role of Industry. Retrieved 2017, from <http://www.itopf.com/fileadmin/data/Documents/Papers/brotherskeeper.pdf>
- Nguyen, D. B. (2008). Overview of Vietnamese law on oil pollution prevention in marine areas. *Journal of National University of Hanoi*, 24th ser., 244-238. Retrieved 2017, from http://tapchi.vnu.edu.vn/ktl_4_08/b4.pdf
- Nguyen, H. S. (2012). Vietnam's Law of the Sea. Retrieved 2017, from <http://extwprlegs1.fao.org/docs/pdf/vie124619.pdf>

- Nguyen, T. D. (2010). Geological evolution and aspects of the petroleum potential of the underexplored parts of the Vietnamese margin. *PetroVietnam*, 10. Retrieved 2017.
- Nguyen, T. H. (n.d.). *Oil Spill Preparedness and Response in Vietnam: Current Status and Recommendations*. Retrieved from http://www.pcs.gr.jp/doc/esymposium/2014/5_Mr_Nguyen_Huy_Trong_word_E.pdf
- Oliveira, S. R. (n.d.). *A Rational Implementation of The International Convention on Oil Pollution Preparedness, Response and Co-Operation, 1990, in Brazil*.
- Ornitz, B. E., & Champ, M. A. (2002). *Oil Spills First Principles: Prevention & Best Response*. Amsterdam, The Netherlands, Elsevier Science Ltd.
- Pålsson, J. (2016). *Oil spill preparedness in Sweden: prevention, planning, and response for large accidents* (Ph.D). World Maritime University.
- Parker, H. A., Teubner, R. T., & Sawicki, J. C. (2009). Spill Response Planning in the Philippines: 3-Tier Interaction between Government and Industry. Retrieved 2017, from www.interspill.org/previous-events/2009/12-May/pdf/1630_parker.pdf
- Pham, G. T. (2013). *Coastal and Island Governance in Vietnam*. Retrieved from http://www.un.org/depts/los/nippon/unnff_programme_home/fellows_pages/fellows_papers/Pham_1314_VietNam.pdf
- Pham, G. T. (2016). Overview of oil spill preparedness and response in Vietnam. Retrieved 2017, from http://vasi.gov.vn/tong-quan-ve-chuan-bi-va-ung-pho-su-co-tran-dau-o-viet-nam_1982.news.aspx
- Prime Minister. (2013). *The Regulation on Oil Spill Response* (Vietnam, Government). Hanoi.
- Pollution Control Department. (2012). *Synthesized report on the formulation of economic and technical norms for assessment and determination of environmental damage caused by oil spills*. Hanoi: MONRE.
- Reischig, T. (n.d.). Map of 11 countries in Southeast Asia. Retrieved 2017, from <http://seamap.env.duke.edu/swot>
- Sea Alarm. (2009). Singapore. Retrieved 2017, from <http://www.sea-alarm.org/wp-content/uploads/2012/05/singapore.pdf>
- Thailand Marine Department. (n.d.). ASEAN-OSPAR Project. Retrieved 2017, from <http://www.md.go.th/en/index.php/component/k2/item/420-asean-ospar-project>
- The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA). (n.d.). ESTIMATES OF GLOBAL INPUTS OF OIL TO THE MARINE ENVIRONMENT. Retrieved 2017, from <http://oils.gpa.unep.org/facts/sources.htm#NRC>

- The International Maritime Organization (IMO). (1996). Implementation of the OPRC Convention & Perspective of IMO's Role. Retrieved 2017, from http://www.pcs.gr.jp/doc/esymposium/12170/96_gurpreet_s_singhota_e.pdf
- The International Maritime Organization (IMO). (2017, May). Status of Conventions. Retrieved 2017, from <http://www.imo.org/en/About/Conventions/StatusOfConventions/Pages/Default.aspx>
- The International Maritime Organization (IMO). (n.d.). International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC). Retrieved 2017, from [http://www.imo.org/en/about/conventions/listofconventions/pages/international-convention-on-oil-pollution-preparedness,-response-and-co-operation-\(OPRC\).aspx](http://www.imo.org/en/about/conventions/listofconventions/pages/international-convention-on-oil-pollution-preparedness,-response-and-co-operation-(OPRC).aspx)
- The International Oil Pollution Compensation Funds (IOPC Funds). (2015). Guidelines for presenting claims for clean-up and preventive measures. Retrieved 2017, from http://www.iopcfunds.org/uploads/tx_iopcpublications/Clean_up_Guidelines_e_01.pdf
- The International Tanker Owners Pollution Federation Limited (ITOPF). (2009). Singapore. Retrieved 2017, from <http://www.itopf.com/knowledge-resources/countries-regions/countries/singapore/>
- The International Tanker Owners Pollution Federation Limited (ITOPF). (2010). Philippines. Retrieved 2017, from <http://www.itopf.com/knowledge-resources/countries-regions/countries/philippines/>
- Trinh, C. T. (2011). *Assessment of the Compatibility in Organization, Operation of the Monitoring, Detecting, Response, Address Oil Spill in Vietnam under the OPRC Convention and Proposing the Solution* (Science and Technology, pp. 20-42, Rep.). Hanoi: MONRE.
- United Nations Conference on Trade and Development (UNCTAD, 2016). (2016). [Http://unctad.org/en/PublicationsLibrary/rmt2016_en.pdf](http://unctad.org/en/PublicationsLibrary/rmt2016_en.pdf). Retrieved 2017, from http://unctad.org/en/PublicationsLibrary/rmt2016_en.pdf
- Vietnam Maritime Administration (VINAMARINE). (2015). *Plan of Prevention and Responsibility on Maritime and Inland Waterways in Vietnam* (Vietnam, Ministry of Transport). Hanoi: VINAMARINE.
- Vietnam Maritime Administration (VINAMARINE). (2012). *Report on environmental protection activities in the Vietnams' maritime industry in 2012* (Vietnam, Ministry of Transport). Hanoi: VINAMARINE.
- Vietnam Maritime Administration (VINAMARINE). (2015). Statistics report first half of 2015. Retrieved 2017, from <http://www.vinamarine.gov.vn/Download/news/2743.CHHVN-VTDVHH.signed.pdf>

- Vietnam Maritime Administration (VINAMARINE). (2016). Maritime statistics report in Vietnam in 2015. Retrieved 2017, from <http://www.vinamarine.gov.vn/Download/Law/1385.CHHVN-VTDVHH.signed.pdf>
- Vietnam Ministry of Natural Resources and Environment (MONRE). (2013). *The Project for Pollution Control in the Marine Environment in Quang Ninh Province, Vietnam*. Retrieved from <http://quangninh.gov.vn/vi-VN/so/sotainguyenmt/Lists/Danh%20sch%20cc%20bi%20vit%20tin%20tc%20v%20s%20kin/Attachments/274/KH%20KSON%20QNinh.pdf>
- Vietnam Sea and Islands Administration (VASI), Vietnam. (2017). *To review, supplement and amend legal documents and promulgate new regulations on monitoring, risk assessment, response, overcoming and dealing with the consequences of marine oil spills* (Vietnam, Ministry of Natural Resources and Environment). Hanoi: MONRE.
- Vietnam's Prime Minister. (2013). Decision No. 02/2013/QĐ-TTg dated 14 January 2013 promulgating the Regulation on oil spill incident response. Retrieved 2017, from <http://www.thanhtra.gov.vn/ct/vbpq/Lists/LawDocument/Attachments/1002/02.2013.Q%20C4%2090%20TTg.pdf>
- Warner, R. (2015). *Stemming the Black Tide: Cooperation on Oil Pollution Preparedness and Response in the South China Sea and East Asian Seas*. Retrieved 2017, from <http://www.tandfonline.com/doi/full/10.1080/13880292.2015.1044807>
- WCMRC. (n.d.). *The Basics of Marine Oil Spill Response*. Retrieved from <http://www.wcmrc.com/wp-content/uploads/2011/07/Marine-Oils-Spill-Response-Techniques.pdf>

APPENDIXES

APPENDIX 1 - LIST OF THE MEMBER STATES OF THE INTERNATIONAL CONVENTION FOR THE PREPAREDNESS, RESPONSE AND COOPERATION OF OIL SPILL INCIDENTS, 1990 (OPRC) UP TO 28/7/2017 OF IMO

No.	Name of Member State
1.	Albania
2.	Algeria
3.	Angola
4.	Antigua & Barbuda
5.	Argentina
6.	Australia
7.	Azerbaijan
8.	Bahamas
9.	Bahrain
10.	Bangladesh
11.	Belgium
12.	Benin
13.	Brazil
14.	Bulgaria
15.	Cameroon
16.	Canada
17.	Cabo Verde
18.	Chile
19.	China
20.	Colombia
21.	Comoros
22.	Congo
23.	Cote d'Ivoire
24.	Croatia
25.	Cuba
26.	Denmark
27.	Djibouti
28.	Dominica
29.	Ecuador
30.	Egypt
31.	El Salvador
32.	Estonia
33.	Finland
34.	France
35.	Gabon

36.	Georgia
37.	Germany
38.	Ghana
39.	Greece
40.	Guinea
41.	Guyana
42.	Honduras
43.	Iceland
44.	India
45.	Iran (Islamic Republic of)
46.	Ireland
47.	Israel
48.	Italy
49.	Jamaica
50.	Japan
51.	Jordan
52.	Kenya
53.	Latvia
54.	Lebanon
55.	Liberia
56.	Libya
57.	Lithuania
58.	Madagascar
59.	Malaysia
60.	Malta
61.	Marshall Islands
62.	Mauritania
63.	Mauritius
64.	Mexico
65.	Monaco
66.	Morocco
67.	Mozambique
68.	Myanmar
69.	Namibia
70.	Netherlands
71.	New Zealand
72.	Nigeria
73.	Norway
74.	Oman
75.	Pakistan
76.	Palau
77.	Peru
78.	Philippines

79.	Poland
80.	Portugal
81.	Qatar
82.	The Republic of Korea
83.	Romania
84.	Russian Federation
85.	Saint Kitts and Nevis
86.	Saint Lucia
87.	Samoa
88.	Saudi Arabia
89.	Senegal
90.	Seychelles
91.	Sierra Leone
92.	Singapore
93.	Slovenia
94.	South Africa
95.	Spain
96.	Sudan
97.	Sweden
98.	Switzerland
99.	The Syrian Arab Republic
100.	Thailand
101.	Togo
102.	Tonga
103.	Trinidad & Tobago
104.	Tunisia
105.	Turkey
106.	United Kingdom
107.	United Rep. of Tanzania
108.	United States
109.	Uruguay
110.	Vanuatu
111.	Venezuela
112.	Yemen

Note: According to the status of Conventions” of IMO dated 28 July 2017, 112 countries are members of the OPRC Convention

(Source: IMO, 2017)

APPENDIX 2 - LIST OF INTERNATIONAL CONVENTIONS RELATED TO OIL SPILL INCIDENT RESPONSE TO WHICH VIETNAM IS A MEMBER STATE

I. IMO CONVENTIONS

1. The International Convention on Civil Liability for Oil Pollution Damage, 1969
2. The International Regulations for Preventing Collisions at Sea 1972 (COLREGs)
3. 06 Annex to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 and 1997 (MARPOL)
4. The International Convention for the Safety of Life at Sea (SOLAS), 1974
5. Amendments to the Protocol of 1978, 1988 relating to the International Convention for the Safety of Life At Sea, 1974
6. The International Convention on Maritime Search and Rescue, 1979
7. The Convention on the Suppression of Unlawful Acts against the Safety of Maritime Navigation, 1988.
8. Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms Located on the Continental Shelf (1988 SUA Protocol)
9. Protocol of 1992 to amend the International Convention on Civil Liability for Oil Pollution Damage (CLC 1992)
10. The International Convention on Civil Liability for Bunker Oil Pollution Damage (BUNKER)

II. THE CONVENTIONS OF THE UNITED NATIONS

11. United Nations Convention on the Law of the Sea, 1982.

III. REGIONAL AGREEMENTS

12. The Agreement between the Governments of Socialist Republic of Vietnam and Republic of the Philippines on Oil Spill Preparedness and Response, 2010

13. Joint Statement on Partnership in Oil Spill Preparedness and Response Cooperation in the Gulf of Thailand between Vietnam, Cambodia, and Thailand, 2006
14. Agreement for the Facilitation of Search of Ships in Distress and Rescue of Survivors of Ship Accidents, 1975
15. Memorandum of Understanding on ASEAN Cooperation Mechanism for Joint Oil Spill Preparedness and Response, 2014

(Source: Dao & Nguyen, n.d.)

APPENDIX 3 - LIST OF VIETNAM'S LEGAL DOCUMENTS RELATING TO THE PREVENTION OF MARITIME ENVIRONMENTAL POLLUTION

I. LEGAL DOCUMENTS ISSUED BY THE NATIONAL ASSEMBLY

1. Law on Environmental Protection in 2014.
2. Maritime Code 2015.
3. Petroleum Law 1993, revised 2008.

II. PROVISIONS ISSUED BY THE STANDING COMMITTEE OF THE NATIONAL ASSEMBLY

4. Ordinance on procedures for arrest of seagoing vessels of the Standing Committee of the National Assembly, No. 05/2008 / PL-UBTVQH12 dated 27/8/2008.
5. Ordinance of the Vietnam Sea Police, 2008.

III. PROVISIONS ISSUED BY THE GOVERNMENT

6. Decree No. 36/1999/ND-CP on sanctioning of administrative violations in the coastal zone, adjacent areas, exclusive economic zone and continental shelf of the Socialist Republic of Vietnam.
7. Decree No. 03/ND-CP of the Government providing for the protection of petroleum security and safety.
8. Decree No.175-CP of October 18, 1994 guiding the implementation of the Law on Environmental Protection.
9. Decree No. 121/2004 /ND-CP dated 12/5/2004 on sanctioning administrative violations in the field of Environmental Protection Law.
10. Decree No. 137/2004/ND-CP on June 16, 2004 on sanctioning administrative violations in the sea areas and continental shelf of Vietnam.
11. Decree No. 25/2009/ND-CP dated 6 March 2009 of the Government on Integrated Management of Natural Resources and Environmental Protection in the Sea and Islands.

12. Decree No. 96/2009/ND-CP dated October 30, 2009 of the Government on the disposal of buried or sunk property discovered or found on the land, islands and sea of Vietnam.
13. Decree No. 57/2010/ND-CP dated 25 May 2010 of the Government detailing and guiding the implementation of the Ordinance on the Arrest of Vessels.
14. Decree No. 95/2010/ND-CP dated 16 September 2010 of the Government on the licensing and coordination of activities with foreign search and rescue forces in Vietnam.

IV. LEGAL DECISIONS ISSUED BY THE PRIME MINISTER

15. Directive No. 07/1998/CT-TTg on February 5, 1998 of the Prime Minister on the elaboration of search and rescue plans from the central to local levels.
16. Directive No. 17/2003/CT-TTg of the Prime Minister on enhancing management of maritime safety.
17. Decision No. 129/2001/QD-TTg of Prime Minister on August 29, 2001 approving the national program on response to oil spills for the 2001-2010 period.
18. Decision No. 256/2003/QD-TTg on December 2, 2003 of the Prime Minister approving the national environmental protection strategy up to 2010 and orientations towards 2020.
19. Decision No. 328/2005/QD-TTg dated 12/12/2005 of the Prime Minister approving the National Plan for Environmental Pollution Control up to 2020.
20. Decision No. 103/2005/QD-TTg dated May 23, 2005 of the Prime Minister promulgating the Regulation on oil spill incident response.
21. Decision No. 46/2006/QD-TTg dated February 28, 2006 by the Prime Minister approving the master plan for the search and rescue up to 2015 with a vision to 2020.
22. Decision No. 18/2009/QD-TTg dated 03/02/2009 of the Prime Minister approving the Master Plan for Socio-Economic Development of Vietnam's Coastal and Coastal Gulf of Thailand Gulf of Thailand, up to 2020.

23. Decision No. 76/2009/QĐ-TTg dated May 11, 2009 by the Prime Minister on the strengthening of the National Committee for Search and Rescue and Search and the System of Search and Rescue Organizations of Ministries and Local agencies.
24. Decision No. 118/2008/QĐ-TTg dated August 27, 2008 of the Prime Minister promulgating the Regulation on financial management of search, rescue and disaster response
25. Decision No. 103/2007/QĐ-TTg dated 12 July 2007 of the Prime Minister on the promulgation of the Regulation on coordinated search and rescue at sea.
26. Decision No. 11/2009/QĐ-TTg dated January 16, 2009 of the Prime Minister amending and supplementing articles of the Prime Minister's Decision No. 125/2004/QĐ-TTg of the Prime Minister on the publication, receiving, transmitting and processing information of maritime security.
27. Decision No. 1278/QĐ-TTg dated 14/08/2009 of the Prime Minister approving the plan for the implementation of the Joint Declaration and Framework program between Vietnam, Cambodia and Thailand on cooperation in responding to oil spills in the Gulf of Thailand.
28. Decision 06/2009/QĐ-TTg dated 15/01/2009 of the Prime Minister approving the plan for the implementation of the International Convention on Search and Rescue of Marine in 1979.
29. Decision No. 84/2010/QĐ-TTg dated December 15, 2010 of the Prime Minister promulgating the Regulation on oil and gas exploitation shall replace Decision 163/1998/QĐ-TTg on September 7, 1998 promulgating the Regulation on exploitation of oil and gas resources.

IV. LEGAL DOCUMENTS BY THE MINISTRIES

30. Decision No. 48/2005/QĐ-BGTVT on September 30, 2005, of the Minister of Communications and Transport, on maritime accident reporting and investigation.

31. Decision No. 49/2005/QD-BGTVT on October 4, 2005, of the Minister of Communications and Transport on the application of the International Code of Prevention of Collisions at Sea.
32. Decision No. 56/2005/QD-BGTVT on October 28, 2005, of the Minister of Communications and Transport for the organization and operation of the Vietnam Maritime Search and Rescue Coordination Center.
33. Decision No. 59/2005/QD-BGTVT on November 21, 2005, of the Minister of Communications and Transport promulgating the Regulation on Maritime safety equipment and prevention of environmental pollution installed onboard Vietnamese sea-going ships operating on domestic routes.
34. Decision No. 103/2007/QD-BGTVT on July 12, 2007, of the Minister of Communications and Transport, promulgating the Regulation on coordinated search and rescue at sea.
35. Decision No. 707/QD-BGTVT on March 25, 2009, of the Minister of Communications and Transport promulgating the Plan for Organization of the Implementation of the 1979 International Convention on Search and Rescue.
36. Circular No. 17/TT-BGTVT dated 11 August 2009 on marine accident reporting and investigation.
37. Circular No. 23/2010/TT-BGTVT dated 25/8/2010 of the Ministry of Communications and Transport promulgating national technical standards “Rules of marine pollution prevention systems”.
38. Circular No. 2262/TT-MTg of December 29, 1995 of the Ministry of Science, Technology and Environment on “Addressing oil spill incidents”.
39. Decision No. 395/1998 / QD-BKHCMNT of April 10, 1998 of the Minister of Science, Technology and Environment issuing the Regulation on the protection of the environment in the search, exploration, development of mines, exploitation, storage, transport and processing of petroleum and related services.

40. Circular No. 2592/1996/TT-BKHCMNT of the Ministry of Science, Technology and Environment on the control of oil pollution caused by ships and river transport.
41. Joint Circular No. 12/2005/TTLT/BTM-BTNMT-BGTVT of July 8, 2005, guiding conditions on marine environment safety for oil supply activities for sea-going ships.
42. Decision No. 02/2013/QĐ-TTg dated 14/01/2013 of the Prime Minister promulgating the Regulation on oil spill incident response.

V. OTHER DOCUMENTS

43. Some documents issued by the People's Committees of Quang Ninh, Hai Phong, Nghe An, Quang Nam, Khanh Hoa, Ninh Thuan, etc., related to prevention, remedy and treatment of environmental pollution caused by oil.
44. Search and rescue plans, oil spill response of coastal areas
45. Emergency plans and oil spill incident response plans of Vietnam Oil and Gas Group; Vietnam National Petroleum Corporation; Dung Quat Oil Refinery, VIETSOPETRO Joint Venture, oil and gas companies.

(Source: VASI, 2017)

APPENDIX 4- LIST OF OIL SPILL RESPONSE FACILITIES AND EQUIPMENT OF REGIONAL OIL SPILL RESPONSE CENTERS

No.	Name of equipment	Unit	Total	Regional center		
				Northern	Central	Southern
A	Vehicles					
1	Truck crane 25 tons		06	02	02	02
2	Truck crane 16 tons	pcs	03	01	01	01
3	Forklift 2 tons	pcs	05	02	01	02
4	Forklift 8 tons	pcs	03	01	01	01
5	Truck 5.5 ton	pcs	04	02	01	01
6	Truck 3.5 ton	pcs	08	03	02	03
7	Other trucks	pcs	06	02	02	02
8	Water Carrier	pcs	05	01	02	02
9	Other cars	pcs	40	10	12	18
B	Specialized oil spill response vessel	pcs	12			
C	All type of boats					
1	Boat ST 750	pcs	08	04	01	03
2	Boat ST 450	pcs	06	03	02	01
3	Boat ST 660	pcs	06	01	03	02
4	Rubber boat AR 420	pcs	10	02	05	03
5	Boat Juno	pcs	08	05	02	01
D	The life of the canvas					
1	Canvas type of 16 m ²	pcs	45	15	20	10
E	Buoys of all kinds					
1	Round Buoy	pcs	785	200	385	200
2	Life jacket	pcs	850	400	250	200
3	Buoy PBI2	pcs	49	04	25	20
4	Buoy XTJF	pcs	16	06		10
F	Booms					
1	Offshore booms	m	7,950	2,500	2,450	3,000
2	Offshore booms (inflatable)	set	34	10	12	12
3	Shallow waters booms	m	7,700	1,600	2,600	3,500
G	Oil collection equipment					
1	Hydraulic winches for booms	set	02	-	-	02
2	Helix 200 oil collector	pcs	10	03	04	03
3	Vacuum and pump Skimmer 140m ³ /h	set	04	02	03	03
4	Vacuum and pump Skimmer 30m ³ /h	set	03	02	01	05

5	Oil water separator	pcs	06	02	02	02
6	Hydraulic shore line cleaning equipment NEPTUNE7-63	set	10	02	06	02
7	Hydraulic shore cleaning equipment NEPTUNE8-103	set	06	02	02	02
8	Submersible pumps NEUM16	set	16	04	07	05
9	Oil Tank ET10	set	08	04	02	02
10	Bag containing oil	pcs	01		01	
11	Temporary storage tank	set	01	01		
12	Dispersant injection system DSS	set	02	01	01	01
14	Anchor buoy	pcs	160	40	70	50
	Buoys, pumps, hydraulic power supplies	set	35	10	10	15
15	Patching machine	pcs	06	02	02	02
16	Buoy repair kit	set	07	02	02	03
17	Accessories of funeral rolling	set	13	03	08	20
18	Pump kit	set	08	NA	08	NA
19	Buoy support	set	20	NA	20	NA
20	Pulling machine	set	11	NA	11	NA
21	Tractor	pcs	06	NA	06	NA
22	Anchorage system	set	73	NA	73	NA
23	Repair kit	set	02	NA	02	NA
24	Cable	set	01	NA	01	NA
25	Hooks	set	01	NA	01	NA
26	Rolling machine	set	01	NA	01	NA
27	Tube and float	set	03	NA	03	NA
28	Pipes and connector types	m	600	NA	600	NA
H	Oil absorbent material					
1	Oil absorbent buoys	set	180	50	130	NA
2	Oil absorbent material of Spain	set	47	47	NA	NA
3	Oil absorbent material	set	1,298	735	563	NA
4	Dispersant	l	15,000	4,000	5,000	6,000
5	Oil absorber	kg	4,800	4,500	300	NA
I	Other equipment					
1	Korean KAPARON wire	kg	1,340	440	600	300
2	VHF	pcs	07	02	02	03
3	Fire pump 37m ³	pcs	05	02	01	02
4	Generator 5.5 KW	pcs	03	01	01	01

5	Plastic cord	kg	900	400	300	200
6	Incinerator for oil contaminated waste	pcs	02	01	NA	01
7	Generator 5 KW	pcs	02	01	01	01
8	Hydraulic power source 15W for oil float	set	01	NA	NA	01
9	Hydraulic power 15W for marine cranes	set	01	NA	NA	01
10	Hydraulic power 25W	set	04	NA	03	01
11	GUERA Cranes	pcs	01	NA	NA	01
12	Firefighting equipment	set	01	NA	NA	01
13	Pump VANE	set	01	NA	01	NA
14	Spare tools and parts	set	02	NA	02	NA
15	Remote control	set	02	NA	02	NA
16	Engine for pumps	set	03	NA	03	NA
17	Compressor	pcs	03	NA	03	NA
18	Oil burner A850	pcs	01	NA	01	NA
G	Communication equipment					
1	Transceiver ICOM	pcs	18	06	04	08
2	Handheld transceiver	pcs	32	14	10	08
3	Handheld GPS locator	pcs	16	04	02	10
K	Labor protection equipment		NA			

(Source: VINAMARINE, 2015)

Note:

- The above equipment consists only of three oil spill response centers in the North, Central and South.

- Facilities of unit services, seaports, companies that related to exploit and explore petroleum products, as well as specialized oil spill response facilities of provinces have not been synthesized and reported.