

# AN INTEGRATED MANAGEMENT APPROACH AND ITS APPLICATION TOWARDS OIL SPILL EMERGENCY RESPONSE AT A CRUDE OIL TERMINAL

Ismila Che Ishak<sup>1</sup>, Muhammad Haziq Hakimi Mohd Nor Hisham<sup>2</sup>

<sup>1,2</sup>Maritime Management Section, Universiti Kuala Lumpur Malaysian Institute Marine Engineering and Technology, Lumut, Perak, Malaysia

ismila@unikl.edu.my<sup>1</sup>, aziqhakimi77@yahoo.com<sup>2</sup>

## ABSTRACT

This study attempts to analyze the integrated management approach and its application towards an oil spill emergency response at one of the crude oil terminal in Malaysia. It involves the management team and other related parties who are responsible for the emergency of the oil spill at the terminal. This study aims to analyze the current awareness among the oil terminal communities and to examine the current practice of management approach on the emergency response towards the oil spill. This study encompasses two independent variables such as *Current awareness and current practice of management approach* towards the oil spill emergency response. It is very crucial to enhance the current knowledge among the related communities on the hazards, the importance of their role and their responsibilities in combating the oil spill incidents and, to protect the oil spill from reaching the sensitive area at the oil terminal. 53 respondents from different management levels have responded to the questionnaire survey. The results showed that more than 95% of the respondents are aware and able to cope with the current management practices towards the oil spill emergency response at that crude oil terminal. Thus, it is very useful to the terminal communities to familiar with, and aware of the response plan before, during, and post the oil spill incidents.

**Keywords:** Emergency Response, Crude Oil, Awareness, Management Practices

## 1. INTRODUCTION

The environment involved in the port industry has created a great concern with the safety, handling of hazardous cargoes, and other related occurrences emergency that poses threat to the oil terminal community. The effort of cleaning up the oil spill by the communities, related personnel significantly contributes to the effectiveness of the oil spill occurrences. The emergency team at the related port should be well planned and prepared to involve in an oil spill emergency matter and, to adequately supply with an adequate resource. The adequate response in the emergency response should coordinate with the well-coordinated actions among related individuals, organizations, and the related authority within the port community. Therefore, the awareness among the related community to cope with the related possible hazards and the need for mutual preparedness is essential in combating the oil spill incidents. Besides that, effective management practices from all levels are vital in responding to the oil spill emergency response.

### Research Objectives

The objective of this study cover as the following:

1. To analyze the current awareness among oil terminal community for the oil spill emergency response.
2. To evaluate the current practice of management approach in responding towards the oil spill emergency response.

## 2.0 LITERATURE REVIEW

### Oil Pollution in Maritime Business

The maritime business is a significant reason that contributes to oil contamination. For example, the vessel transportation business creates an issue of marine pollution. Transportation is significant in human day-to-day routine life and it is one of the worldwide exchange progression, global normalization, and correspondence (Grammenos,

2013) and (Kumar and Hoffman, 2002). The vessel transportation creates an assembling source and inviting additional danger of unintentional oil spill, which caused serious damage to the ecological system and human being culture (Chang, Stone, Demes and Piscitelli 2014). Oil contamination is a significant issue and creates an effect on the earth and the economy. These contaminations cover over a wide territory of the ocean, create a deterioration of the seawater quality and the destruction of marine life. The factor of physical attributes has influenced the territory and occasional climate condition. The oil contamination control procedures produce contamination on marine life and destroy the environment. The oil slick delivers an awful effect to the marine biological system, naturally, monetary and the travel industry (Shahian, Emtiazi, Cappello, 2012).

## **2.1 Marine Policy and Regulation**

Laws, regulations, and policies for the safety of human health and the environment play an important action to prevent and respond to oil spills incidents. The policy for ocean contamination from ships and offshore installations have been released in the United Kingdom in a regional contingencies program. Throughout Asia, Europe, the People's Republic of China Act on Marine Environment Protection (MEP) was declared throughout 2000 (Zhang & Crooks, 2012). Marine Pollution Prevention Act in Japan has been adopted in compliance with the International Convention as a preventive action to the pollution made by shipping activities (Imai, Yamaguchi & Hori, 2006). The Oil Emission Act and The Merchant Shipping Act (Act No. 515) in Malaysia restricts oil emission activity by ships on the coasts (Kasmin, 2010). In 1989, the International Maritime Organization (IMO) has recognized an International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) to resolve the ecological problems from contamination occurrences at the national level and collaboration by additional nations (Mahapatra, 1995).

## **2.2 The Management Practice of Oil Pollution**

The protection of handling oil pollution should involve international prevention initiatives. The coordination and follow-up to substantiate contamination issues at nations require sufficient specialized manpower. The good management practice on waste minimization assessment within their facility is crucial too (Michael Yhdego, 1995). The preceding case involves the incident command abilities in the oil and gasoline exploration and drilling environment, incident command capabilities require assistance from an Incident Management Team (IMT). The IMT set up in responding to the oil spill incidents consists of an expert team and an operational team in providing training and assistance in dealing with the oil spill occurrence (Crichton, Lauchen, Flin, 2005). The strategy in the incident management tools provides technical methods to act as recommendations for the oil spill activities. The oil spill training consists of the response expertise in emergency policies procedures, emergency workouts, and simulations on operational skills practices.

## **2.3 The Enforcement of Marine Pollution and Other Related Agency**

The Department of Environment (DOE) is dealing with a wide range of tarnishing environments from oil slicks either from vessels, oil stages, and terminals, or other various sources of oil spill incidents. The DOE is a lead office to manage all types of contamination such as oil slicks either from ships, oil stages, and terminals or from various sources as required by the Environmental Quality Act (EQA), 1974 as revised by Act 1953, Environmental Quality (Amendment) Act of 1996. The other related marine act covers the Exclusive Economic Zone (EEZ) Act 1984 (Act 311), the Merchants, Shipping Ordinance, 1952 (Act 70), and the Merchant Shipping Oil Pollution Act 1994 (Act 515) are to ensure and safeguard Malaysia's regional waters and the EEZ. Under Sections 27 and 29 of the EQA, the DOE has agreed to share this responsibility among the Marine Department, the Fisheries Department, the Royal Malaysia Navy (RMN), the Marine Operations Force of the Royal Malaysian Police, and the Royal Malaysian Customs in combating the oil spill incident occurrences.

## **2.4 Prevention, Preparedness, and Response**

The oil preparedness and response contingency plan are a sequence of guidelines in setting up the steps before, during, and after the oil spill emergency response. The main objective is to reduce possible harm to individual wellbeing and the surroundings with an appropriate and organized response towards the oil spill response (Bishop, Boyle, Carson, Chapman, Hanemann, Kanninen & Paterson 2017). (Eide, Endresen, Breivik, Brude, Ellingsen, Røang & Brett, 2007) and (Turner, Skinner, Roberts, Harvey & Ross, 2010). The various concentrations of response preparations are scheduled used for a variety of dimensions along with the effects of the oil spill incidents. The oil spill contingency

plan for provinces, states, as well as the whole country commonly crucial in highlighting roles, obligations, and cooperation among excellent response corporations and committees in providing a specific oil spill response (Coombs, 2015). The oil spill deterrence and emergency plans have determined the various sources of the oil transportation supply along with the storage capacity amenities, ships, pipes, railing vehicles, and automobiles.

Table 1: The contents of a typical contingency plan

First response	Initial measures Preliminary call First processes Addresses and telephone record
Establishment	Activation processes
Concentrations of response	Actions for numerous echelons of escalation techniques
Association	Responsibilities entities and responsibilities
Coverage	Systems actions
Safeguard urgencies	Crucial regions Vulnerable regions
Operations	Personalities and responsibilities Reconnaissance, supervising, and investigation Apparatus utilization Telecommunications record keeping Community affairs Coastline investigation
Action proposes	Operation regions Shoreline evaluation and countermeasures Disposal options
Circumstances	Judgment trees consequences
Exercises	Exercise practices
Records	Connections Apparatus: catalogs, suppliers, distributes Compassion information Additional supplies

Table 1 shows the sample of the required contents of the typical contingency plan. The related federal organization should distribute the legal responsibility and duty together with supplying oversight of response strategies, preserving unforeseen events on various concentrations, and employee coaching.

## 2.5 High Training Program Quality for Response Team Members

A training program should involve numerous parties and produce a high-level-value system. This is significant for a decent oil slick response system and ought to include maritime and coastline emergency response team and other related parties at all required levels in explicating the activities towards cleaning up the oil spills incidents (Osofsky & Osofsky, 2013). A regular training schedule should ensure the proper possibility of the work arrangements. The commitments should gather completely affirmed and comprehended in responding to the oil spill incidents (Lee & Jung, 2013). Besides, the response emergency should contact the person in charge (PIC) effectively in reacting to the oil spill occurrences. The required contingency plan must be intermittently evaluated and update the well-being instructions is important in limit hurt throughout the response. Moreover, several different techniques on oil spill response are utilized with adequate resources, in making the training extra reasonable and more powerful. The appropriate preparation could facilitate the emergency response members to improve their readiness, self-confidence in responding to the oil spills and potential towards recuperating after spills, and to secure oil spill effects (Loureiro, Loomis, and Vázquez, 2009).

## 2.6 An Integrated Management System

A flexible instrument as a common response plan can utilize in responding to oil spill incidents. This will improve the co-appointment arrangement of the response activities inside the related port, administration, and other entities. The complete framework should be used for the readiness and effectiveness of the oil spill actions. The cleanup instrument could help and improve the oil spill countermeasures, and generously limit the ecological effects (Eide, et al, 2007). (The improvement and execution of the complete rules concerning precaution measures could generously assist to prevent spills. An undertaking forceful investigation, checking, executing training programs, and setting up oil spills nationwide could furthermore bolster the ability of proper activities towards the oil spill incidents (Girton, Fitzpatrick, Tebeau & Hansen, 2014). The incorporated crisis board framework around the co-appointment of the getting ready for the best practices, the blended response to any occurrence, the motivation is important to the satisfaction of a productive oil spill consequence (Eide, et al, 2007) and (Frynas, 2012).

## 3.0 METHODOLOGY

### 3.1 Scope of the Study

This study involves a population among the emergency management team of one crude oil terminal. The area of the study covers the structure of the emergency management, the emergency team functions from different departments, and the collaborative preparation towards the oil spill emergency response.

### 3.2 Theoretical Framework

The proposed conceptual, theoretical framework was explored and adjusted from the previous researcher. This framework as shown in Figure 1 consists of two variables which are the independent and dependent variables. The independent variables cover the current awareness among the oil terminal community and current practice on the emergency response. Meanwhile, the dependent variable covers the emergency response in the oil spill.

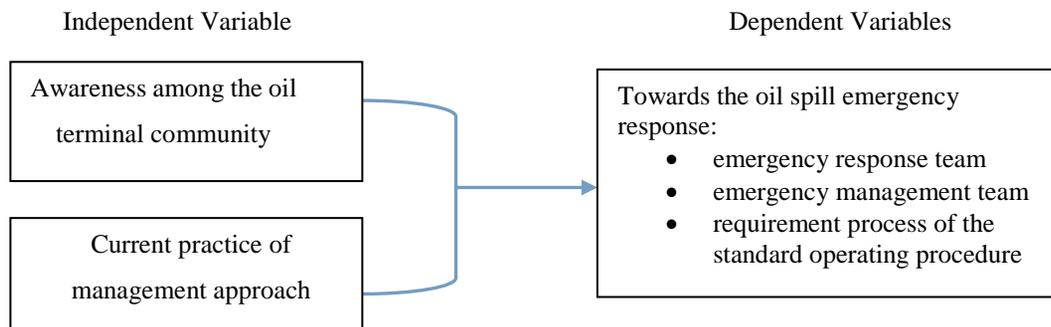


Figure 1: Relationship between the independent and dependent variable

To respond to the oil spill incidents, a collaboration from all oil terminal response members and related communities is needed. It is a challenge for the response crew representatives in responding to the oil spill incidents. The emergency response includes the emergency response team and emergency management team to cope with the oil spill incidents. Furthermore, the requirement process of the standard operating procedure comprises the organization, handling the apparatus, and the crew representatives in responding to the oil spill incident.

### 3.3 Research Device Survey of Questionnaire

The research instrument in this study involves the distribution of the questionnaire to the target respondents. The unit analysis of this study is individual among the emergency response team and the management team from the crude oil terminal. The questionnaire was used as a proper survey tool to achieve the research objectives. The close-ended questionnaire was used in this survey and require the respondents to respond using the Likert scale given. The

closed-ended questionnaire was applied as it is easier to collect the data from respondents because the study provides multiple choices of answers. Thus, it is easier for the respondents to choose the best answers among the given choices. There were five sections which cover as follows: Section A: about respondent backgrounds namely age, gender, academic qualification, working capabilities, and current position. Section B: about the crude oil terminal, number of the response team, number of the management team, and years of establishment. Section C: about independent variables for awareness among the oil terminal communities and the current practices towards the oil spill emergency response. Section D: about the dependent variable on the oil spill emergency response that covers the emergency response team, emergency management team, and the required process of the standard operating procedure.

### 3.4 Nominal Scale and Likert Scale

This study applied two types of scale to measure the variables which are nominal scale and Likert scale. The nominal scale represents data only for unique identifiers instead of numerical value (Velleman & Wilkinson, 1993). It is used to analyze the collected data and to examine the descriptive statistics. Section A applied the nominal scale to analyze data of the age, gender, working experiences, academic qualification, and department. Meanwhile, the Likert scale was applied to evaluate the respondent's amount of agreement on several declarations presented in the questionnaire. This study applied 5 points to enable respondents to provide their degree of agreement using the Likert scale as shown in Table 2.

Table 2: Likert scale score

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

## 4.0 DATA ANALYSIS AND DISCUSSION

This part covers a review after gathering information from respondents. The statistics remained evaluated by utilizing Statistical Package Social Sciences (SPSS) software edition 25. The SPSS analysis tool is applied as it is a comprehensive system enable to analyze data, to construct report, chart, plots of the distribution and trend, descriptive and complex statistical analysis (Jaggi and Batra, 2012). This study analyzes data for the pilot test, reliability test, normality, and chi-square test.

### 4.1 Population, Sample, and Respondent

Table 3: Population, sample, and respondents

Agency	Population	Sample	Respondent
A crude oil terminal	70	70	53
Total	70	70	53

The total population of this study involves few related departments in emergency response for the oil spill occurrences from the related crude oil terminal company. A sample was taken from the whole desired population. 53 respondents have contributed to the questionnaire survey which gave a response rate of 75.71%. The failure rate was at 24.29% or by 17 samples who were not able to respond during the questionnaire distribution.

### 4.2 Descriptive Analysis of the Respondents Demography

Descriptive statistics analysis is applied to analyze the demographic data of the respondents. The demographics of the respondents have been analyzed and interpreted as shown in Table 4.

Table 4: Background of Respondent

Items	Description	Frequency	Percentage
Gender	Male	42	79.25
	Female	11	20.75
	Total	53	100
Marital Status	Married	24	45.28
	<b>Single</b>	<b>27</b>	<b>50.94</b>
	Widowed	2	3.77
	Total	53	100
Age	18 – 25	11	20.75
	<b>26 – 33</b>	<b>23</b>	<b>43.40</b>
	34 – 41	13	24.53
	41 years old and above	6	11.32
	Total	53	100
Level of education	Master	9	16.98
	<b>Degree</b>	<b>32</b>	<b>60.38</b>
	Diploma	12	22.64
	Total	53	100
Current position	Management	15	28.30
	<b>Operations</b>	<b>20</b>	<b>37.74</b>
	Technician	8	15.09
	Officer	10	18.87
	Total	53	100
Working experiences	Less than 1 year	6	11.32
	<b>2 – 5</b>	<b>20</b>	<b>37.74</b>
	6 – 10	14	26.42
	11 years and above	13	24.53
	Total	53	100

*Gender:* This study was dominated by **the** male by 42 respondents or 79.25 %. For females was 11 respondents or by 20.75%. The male is the majority gender as the company is related to the oil and gas industry where men are dominant as compared to the female gender. *Marital status:* 24 respondents are married or by 45.28%, a single by 27 respondents or by 50.94%, and only 2 respondents are widowed or by 3.77%. There is a difference between all marital status due to the age differences. *Age:* There were four categories. The highest number of respondents was in the category of 26-33 years old by 23 respondents or by 43.4%. The age between 34 – 41 years old by 13 respondents or by 24.53%. There were age 18-25 years old by 11 respondents or 20.75% and 46 years old and above by 11.32% or by 6 respondents. *Highest level of education:* The highest percentage was 60.38% or by 32 respondents have a numerous degree background. The diploma holders by 12 respondents or by 22.64%, master certificate by 9 respondents or by 16.98%. *The current position in the company:* the highest percentage in the current position was the operational staff, which consist of 20 respondents or by 37.74 %. The management position by 15 respondents or by 28.30%. 10 respondents hold an officer position or by 18.87% and 8 respondents work as technicians or by 15.09%. *Working experiences:* The highest working experience was 20 respondents who have 2 – 5 years working experience, 14 respondents with 6-10 years or by 26.42%, and 13 respondents have worked more than 11 years in the company. Thus, the various years of working experiences improve the emergency response teamwork efficiencies.

#### 4.3 Pilot Test

A Pilot was conducted and has represented as a minor study to review the study procedures, statistics compilation methods, sample enrollment approaches as preparation for this study. The pilot test was carried out to test the reliability and validity of the questionnaire. It was applied to make sure the questions are suitable and easy to understand among the real respondents. The pilot test involved 10 respondents from a few marine-related companies and marine institutes located in Lumut, Perak to validate the questions.

#### 4.4 The Reliability Test and The Cronbach's Alpha

Table 5: Cronbach's Alpha if Item Deleted

Items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
27	179.45-181.10	82.832-88.358	.0172-0.686	.798-.847

Table 6: Reliability statistics

Reliability statistics	
Cronbach's alpha	No of items
.736	27

There were 27 items of the questionnaires that have been examined and it indicated a Cronbach's alpha in the range from 0.798 to 0.847. The Cronbach's alpha value was at 0.736. This Cronbach's coefficient alpha displayed core uniform reliability of the study queries that the reliability coefficient is closer to 1.0. as shown in Tables 5 and 6.

#### 4.5 Normality Test

Table 7: Normality Test

Kolmogorov-Smirnov <sup>a</sup>		
Statistic	Df	Sig.
.214- .530	53	.000

A normality test was tested to analyze if the sample data fits normal dissemination. The normality test was executed by arithmetically or graphically test using the Kolmogorov-Smirnov test (KS test). This method applies to the testing of the distribution with the specified mean and variance at 0.000 as shown in Table 7. It has indicated that the data qualify for data normalization and it can be established that the sample normality does not differ from the population.

#### 4.6 The Correlation Theoretical Framework

Recommended correlation theoretical framework encompasses components of independent and dependent variables as displayed in Figure 1. The independent variables consist of Awareness among the oil terminal community and current practice of management approach on the oil spill emergency response as the dependent variable. The correlation analysis is a method specifically utilized for analyzing the connection amongst two quantitative and constant variables. The correlation analysis delivers an evaluation of the relationship amongst two measurement variables. Pearson's correlation coefficient ( $r$ ) is a solid component of the correlation amongst two variables.

#### 4.7 The Rule of Thumb Guideline for Interpretation of Correlation Coefficient

Figure 2 represents the assortment of values for the correlation coefficient intensity towards establishing the connection concentration of the variables.

- $0.0 = |r|$ : no correlation
- $0.0 < |r| < 0.2$  : very weak correlation
- $0.2 \leq |r| < 0.4$  : weak correlation
- $0.4 \leq |r| < 0.6$  : moderately strong correlation
- $0.6 \leq |r| \leq 0.8$  : strong correlation
- $0.8 \leq |r| < 1.0$  : very strong correlation
- $1.0 = |r|$  : perfect correlation

Figure 2: Correlation Coefficient Guideline: (Montgomery & Runger, 2014)

The Pearson's correlation coefficient entails together variables towards remaining the control at an intermission or ratio range and the computation is established on the significant value (Montgomery & Runger, 2014). The correlation value which is closer to the value of 1.0, has a solid substantial connection amongst the variables. Moreover, the connection value that is close to 0 or -1 correlates with the variables, although a destructive correlation coefficient is substantially fragile on the correlation amongst variables (Montgomery & Runger, 2014).

#### 4.8 The Analysis of the Correlation

The correlation evaluation was applied to obtain the level and direction of action and allows to investigate anticipated correlation amongst the two variables (Puth, Neuhäuser & Ruxton, 2014). The correlation evaluation is also utilized to illustrate the intensity of the connection between two or more variables. The Pearson correlation coefficient ( $r$ ) is a gauge for determining the intensity of the relationship amongst these two variables (Coakes, Steed & Ong, 2009).s The assortment of the correlation coefficient ( $r$ ) as shown in Table 8 has revealed that the value of  $r = 0.70$  is acceptable of the internal consistency to reveal the constructive and resilient correlation amongst the variables. It was indicated that the closer the connection is to 1.0, the better the correlation between the two variables (Cortina, 1993).

Table 8: Cronbach's alpha interpretation

Cronbach's Alpha Value	Description
More than 0.9	Excellent
0.8	Good
0.7	Acceptable
0.6	Quotable
0.5	Poor
Less than 0.5	Unacceptable

#### 4.9 The Correlation Analysis of Awareness Among the oil Terminal Community and Emergency Response

The Pearson correlation value between awareness among the oil terminal community towards the emergency response in an oil spill is  $r = 0.783$  as shown in Table 9 which specifies that the value of connection is a constructive correlation. The contribution of awareness among the oil terminal community is significant, particularly in the view of the oil spill emergency response that requires an entire response (Kasmin, 2010).

Table 9: The correlation of Awareness Among the oil Terminal Community and Emergency Response

Correlation			
		Awareness among the oil terminal community	Towards the oil spill emergency response
Awareness among the oil terminal community	Pearson Correlation	1	<b>.783**</b>
	Sig. (2-tailed)		.000
	N	53	53
Towards the oil spill emergency response	Pearson Correlation	<b>.783**</b>	1
	Sig. (2-tailed)	.000	
	N	53	53

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Table 9 shows the degree and the trend of such interactions of both variables established by the correlation analysis. Pearson's correlation coefficient ( $r$ ) is a measure of the strong correlation amongst the two variables participating in this study. This correlation outcome indicates two of the independent variables have a substantial correlation along with the dependent variable (Puth et.al (2014). The first independent variable involves the awareness among the oil terminal community towards the oil spill emergency response are significantly and positively  $r= 0.783$  correspondingly. This outcome shows the correlation with the awareness among the oil terminal community towards the oil spill emergency response. The correlation analysis has given impact by awareness among the oil terminal community which endorsed. The outcomes reveal that there occurs a connection amongst the variable since the independent variable of the awareness among the oil terminal community is substantial and closely associated to the oil spill emergency response (Zhong et.al, 2011).

#### 4.9.1 The correlation analysis of the current practice of management approach and emergency response

Table 10 shows that the current practice of management approach and emergency response is strongly correlated with 0.834. This associated value is ranked as the highest correlation during the oil spill emergency response. The value of the Pearson correlation coefficient between the current practice of management approach towards the oil spill emergency response is  $r = 0.834$  as shown in Table 10 which reveals that the value of the correlation is strongly correlated (Zhong & You, 2011) and (Al-Majed, Adebayo & Hossain, 2012). The influence of the management approach on the oil spill emergency response is substantial the management approach is essential in the issue of the oil spill response (Fingas & Brown, 1997), (Fingas, 2010) and (Fingas, 2012).

Table 10: The correlation of current practice of management approach and emergency response

Correlation			
		The current practice of management approach	Towards the oil spill emergency response
The current practice of management approach	Pearson Correlation	1	<b>.834**</b>
	Sig. (2-tailed)		.000
	N	53	53
Towards the oil spill emergency response	Pearson Correlation	<b>.834**</b>	1
	Sig. (2-tailed)	.000	
	N	53	53

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Table 10 shows the degree and the direction of such relationships for the second variable determined by the correlation analysis. The current practice of management approach was strongly positive significantly at  $r= 0.834$  correlated towards the oil spill emergency response. The correlation analysis has given impact by the current practice of

management approach which endorsed. The outcomes reveal that there occurs a solid connection amongst the variables since the independent variable of the current practice of management approach is substantial and strongly correlated towards the oil spill emergency response (Zhong et.al, 2011).

## **5.0 CONCLUSION**

A well-prepared emergency response plan should adhere to marine regulation. This regulation requires the oil terminal industry to contain certain essential elements in the emergency response plan that include:

- Pre-emergency development
- Employees responsibilities
- Boundaries of power and interaction
- Emergency alerting and response procedures
- Methods for describing incidents to community, state, and federal governmental organizations

Internal planning should focus on improving the emergency response of the terminal. The plan should be brief and easy to apply with a checklist format. All the related emergency response members must understand their role and the actions that they must take when facing oil spill incidents.

The outcome of this is to improve the attention of emergency administration strategy for the oil terminal using changing systematized expertise, information, and experiences among their employees and administration team. To enhance and increase the emergency management response skill, the response crew members should practice to familiar with the emergency preparedness guidance at the terminal, hazard assessment, safety mitigation, team of worker training, public consciousness, and related emergency response networking.

## **6.0 RECOMMENDATION**

### **Systematic Plan for Effective Response**

#### **The Emergency Response Plans required by regulations**

The adoption of a standard plan should facilitate the integration of plans within a terminal area. If large facilities may need to prepare separate plans for distinct operating units. The facility has had a wide connotation and to include any mobile or fixed onshore or offshore building, structure, installation, terminals, equipment, and pipeline. The facility hazards need to be addressed in a comprehensive and coordinated manner. This concept should also allow coordination of facility plans with the existing emergency response plans and should be maintained regularly. Thus, the specific regulatory requirements should ensure that the facility plans are consistent with the external planning efforts. This will assist to improve the level of emergency response in the oil spill occurrences when the terminal is faced with any incident especially involve the oil spill.

#### **Well Structured Internal Emergency Response**

The need for internal planning is influencing the coherency in the oil spill emergency response plan at the terminal. Those who are engaged in the oil spill emergency response should be familiar with the desired structure of the emergency response plan. The required activity should entail preparation and response of equipment and facilities, natural environment factor a contingency crew division. The equipment technology should suit the latest equipment for effective mechanical procedures throughout the oil spill emergency response.

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