

Republic of Iraq

**Study on
“Establishment of Oil Spill Response Plan
for Crude Export Facility”**

**Special Assistance for Project Implementation
for
“Crude Oil Export Facility Reconstruction Project”
(L/A No. IQ-P7)**

Executive Summary Report for Disclosure

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Executive Summary

1. Introduction

1.1 Background

The Iraqi government has initiated various projects to increase the export capacity of the terminals up to 4.5 million BPD by 2015 through revamping/ reconstruction of the existing export facilities. Upon successful completion of the projects, the crude export facilities of Basrah will be one of the largest crude export terminals in the world.

The spilled oil from the facility, if it occurred unexpectedly, is possible to impact on marine and coastal environment and on the social/ economical activities in the surrounding sea area. In case of a large oil spill, it is expected easily that the spilled oil will traverse the boundaries of the neighboring countries (Kuwait and Iran) depending on the sea currents and winds, and furthermore, oil slicks may be diffused widely in the whole of the Gulf, if no proper response and timely actions are taken.

JICA launched the “Study on Establishment of Oil Spill Response Plan for Crude Export Facility” in 2011 for the potential accidental oil spill in the operation of the terminals. Then, the Consultant developed the “Oil Spill Response Plan for Crude Export Facility (Terminal OSRP)” jointly with the study committee comprised of related ministries and companies of Iraq. The Terminal OSRP describes the applicable strategy, action and operations, organization and resources for the response plan.

1.2 Objectives

The goal of the Study is to establish the functional OSRP, which will address the operations of the crude export facility and other associated marine operations in the territorial seawaters of Iraq. For achieving the goal, the objectives of the Study in this year, which is 2nd phase of the previous study, are;

- (1) Development of a specific OSRP for the crude export terminals (terminal OSRP)
- (2) Study for the response organizations as well as roles and responsibilities
- (3) Study for the preparation of the relevant legal framework in Iraq
- (4) Study for oil spill response resources (personnel, equipment, finances) to be provided

1.3 Study Description

The aimed terminal OSRP shall be able to address any probable oil spill incident on the facility and/ or the operational activities in the sea area to minimize the potential impacts of the spilled

oil on water, on the environment and social aspects in the affected area. The terminal OSRP shall provide the strategy, organization, protective operations, resources, etc. required for execution of the responses properly and effectively.

The Terminal OSRP has been developed properly in accordance with the Basic Oil Spill Response Plan (BOSRP) discussed in the previous phase of the study, which describes the principal response strategy and procedures for the OSRP.

The Study for the Terminal OSRP includes the following items.

- (1) Oil spill response framework in the country
- (2) Environmental and social baseline survey for affected areas
- (3) Environmental and social sensitivity analysis
- (4) Oil spill modeling
- (5) Oil spill impacts and priority protective sensitive areas
- (6) Development of OSRP for the crude export terminals
- (7) Preparation of relevant legislations
- (8) Deployment plan of response equipment
- (9) Manpower and training
- (10) Financial scheme
- (11) Phase 3 Action plan for establishment of OSRP

1.4 Study Concept

1.4.1 Extent of the Study

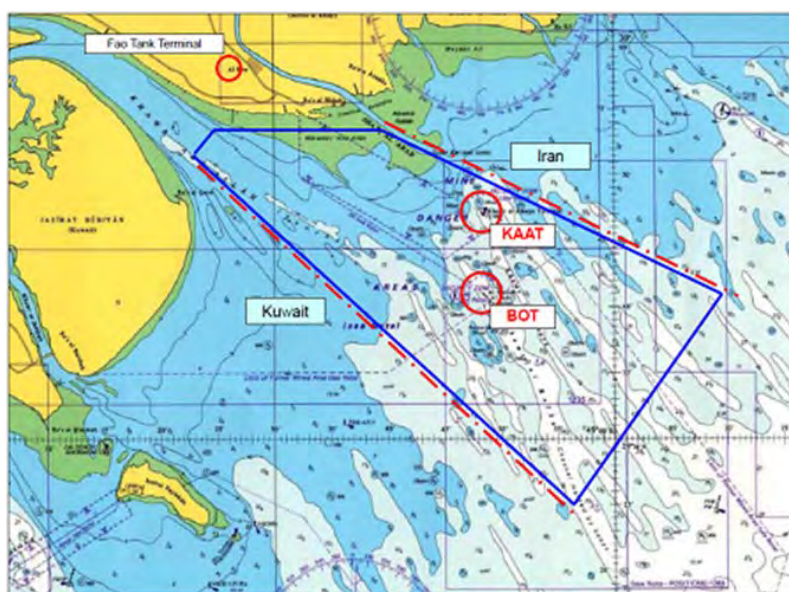


Figure ES1.4.1 Coverage area of Terminal OSRP

The facilities subject to potential oil spills to be addressed by the terminal OSRP are defined as follows.

- Offshore crude export facilities such as Basrah Oil Terminal (BOT), Khor Al-Amaya Oil Terminal (KAAT) and the planned new crude export facility
- Subsea crude pipelines from onshore Fao Terminal to the crude export facilities
- Tankers and other ships traveling in the operational area of the terminals
- Tankers and other ships traveling along the sea lanes outside of the operational area
- Oil drifted from the neighboring country

The seawater areas to be encompassed by the Study, which could be affected possibly by the oil spill from the facilities, are as follows.

- Territorial waters of Iraq in the Gulf
- Waters of neighboring countries
- Other water areas of the northern Gulf

1.4.2 Legal and International Requirements

The terminal OSRP shall be developed essentially in conformance with the requirements for risk management, emergency responses, environmental protection and personnel safety according to the relevant laws of Iraq, which are enacted or will be ratified in the future expectedly.

The terminal OSRP shall also be in compliance with the terms of the applicable international conventions (IMO Conventions) and regional agreements (ROPME), which was already ratified or will be ratified in future by the government of Iraq.

In addition, the Study referred to the applicable international guidelines and practices recognized widely by the oil producing countries and the oil and gas industries in the world.

1.4.3 Oil Spill Response Plan (OSRP)

The crude export terminals subject to the Study are located in the narrow water area between the territorial waters of the neighboring Iran and Kuwait. Accordingly, once a large oil spill incident occurs at the crude export terminal, it is likely that the spilled oil from the terminal will disperse to the waters off the neighboring countries and farther waters in the Gulf depending on the volume of spilled oil and duration of the spill, water currents and weather conditions of the area.

In accordance with the BOSRP developed in the previous phase of the study, the principal strategy for the response operations are to be as follows.

- Tiered response; “Small” “Medium” and “Large” depending on the spilled oil volume and/ or the extent/severity of predicted effects of the event
- Unified commands by the facility operator and relevant authorities

- Trans-boundary oil spill response

Accordingly, the Terminal OSRP addresses necessary responses to not only the small oil spill (Tier 1), but also medium oil spill (Tier 2) and large oil spill (Tier 3).

2. Oil Spill Response Scheme

2.1 General Oil Spill Response Scheme

2.1.1 Oil Spill Incident and Responsible Bodies

The Terminal OSRP shall address any potential oil spill incident arising from various operations in the covered sea areas. The possible oil spill in the territorial water and responsible bodies for respective oil spill cases were confirmed by both study teams. SOC is responsible for oil spill from the crude export facility and pipeline as well as oil spills from tanker and other vessel in the SOC's terminal operational area. GCPI is responsible for oil spill from the vessel cruising along the sea lanes routed outside of the SOC's operational area. Then, MoEn is responsible for the oil drifted from the neighboring country.

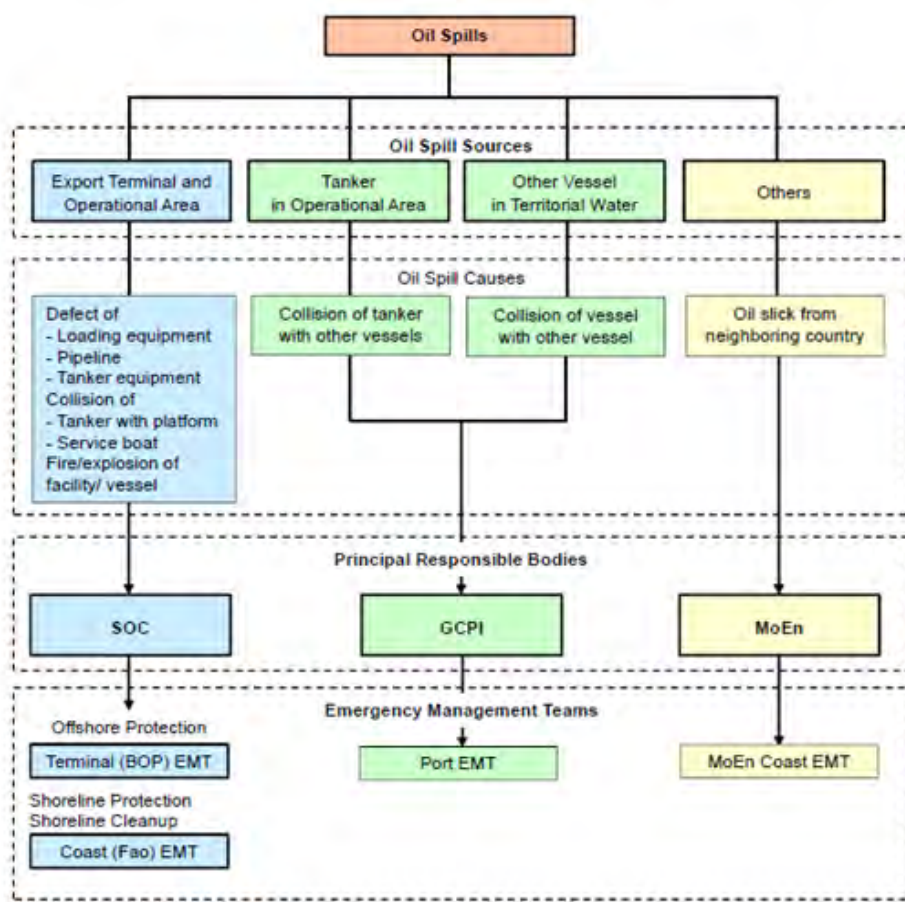


Figure ES2.1.1 Potential oil spill and responsible bodies

2.1.2 Tiered Response System

The Oil Spill Response (OSR) system in Iraq encompasses three (3) tiers of the response organization consisting of facility/ site level (Tier 1), regional level (Tier 2) and country/ governmental level (Tier 3), which shall be managed by the operator of the facility, regional emergency management organization/ regional authority and the concerned governmental authorities (ministries) respectively.

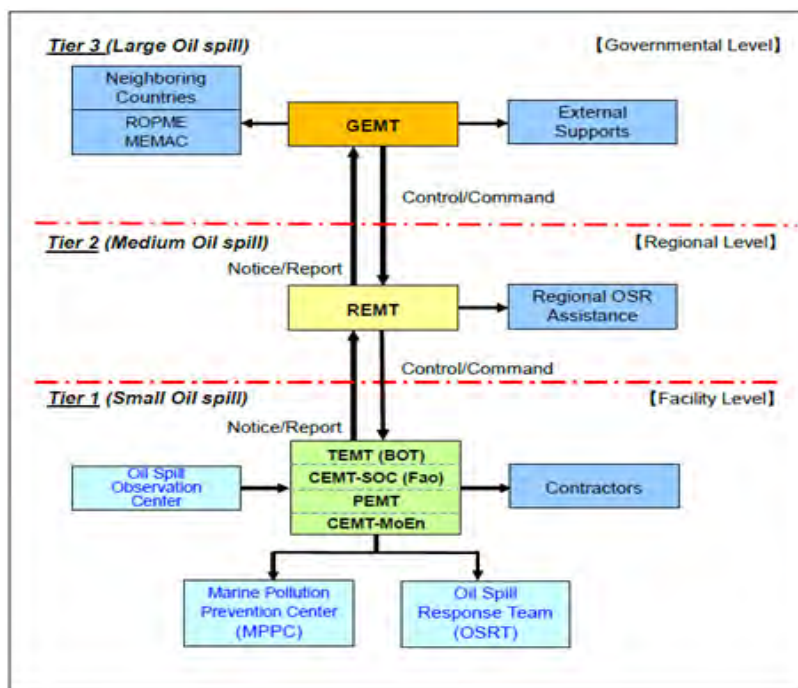


Figure ES2.1.2 Tiered response system

Oil spill response, as emergency response, could require an immediate mobilization of sufficient resources for effective response operations. These are achieved through the joint effort of the responsible body and concerned authorities with dedicated coordination for the responses through a unified command of the emergency response teams comprised with the concerned organizations, e.g. operational company and local and/ or national government.

2.2 Oil Spill Response Organization

The Emergency Management Team (EMT) aims to ensure that the response to any possible oil spill event is consistent with each response organization for respective event tiers, strategy for the response operations and control as well as communication procedure required for achieving the objectives.

The proposed typical organization of Terminal EMT at Basra Oil Terminal (BOT) is shown as follows.

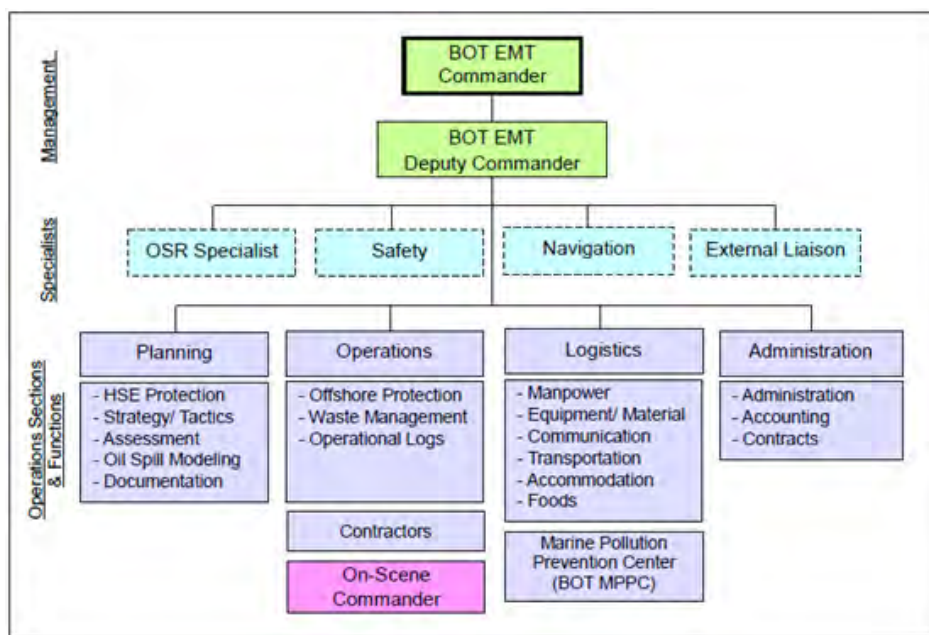


Figure ES2.2-1 Terminal (BOT) EMT organization

Regional EMT for Tier 2 medium oil spill response scheme is shown below.

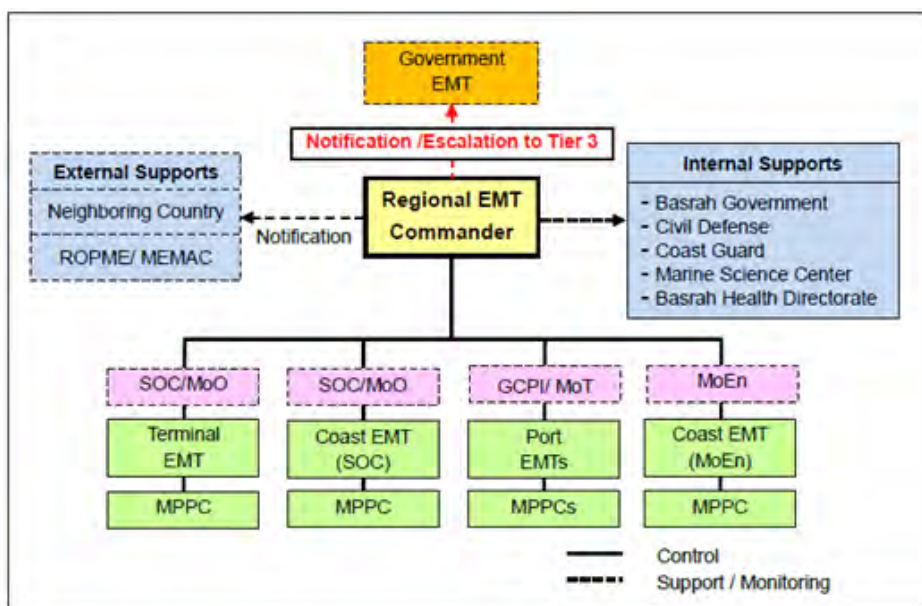


Figure ES2.2-2 Tier 2 OSR scheme

Larger organization is required for the Regional EMT for Tier 2 response. A number of specialist groups is included in the EMT and provide expert advice to the EMT members.

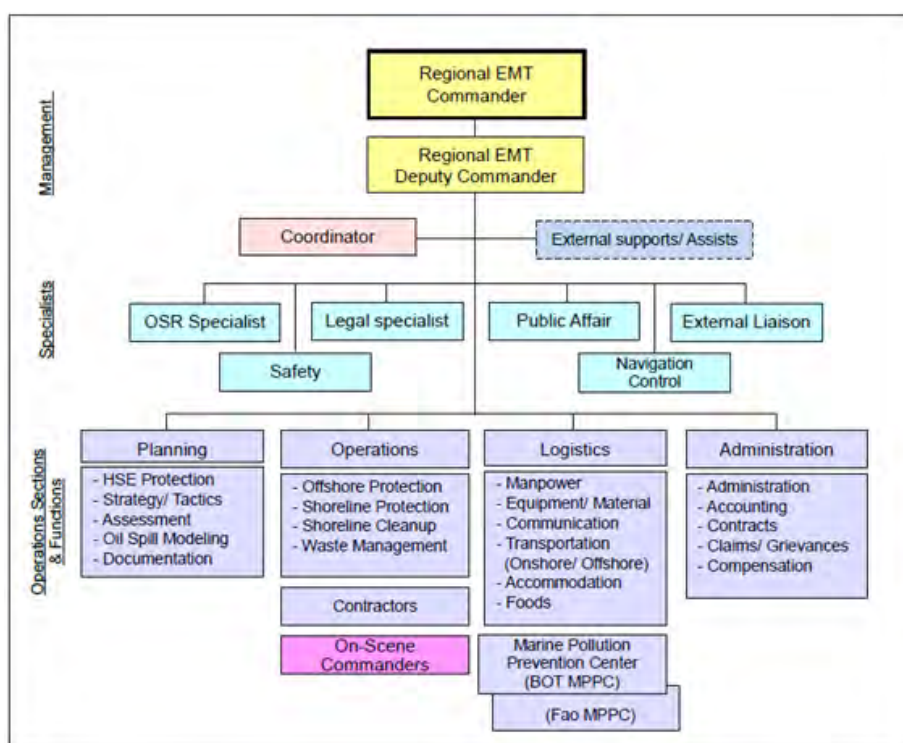


Figure ES2.2-3 Regional EMT organization

Governmental EMT (GEMT) for Tier 3 OSR scheme for large oil spill is shown below. Tier 3 oil spill, which is predicted to be a trans-boundary oil spill or excessively larger oil spill than the capability of the regional EMT, is controlled by the Governmental EMT (GEMT) headed by the Commander assigned by the top of the responsible ministry.

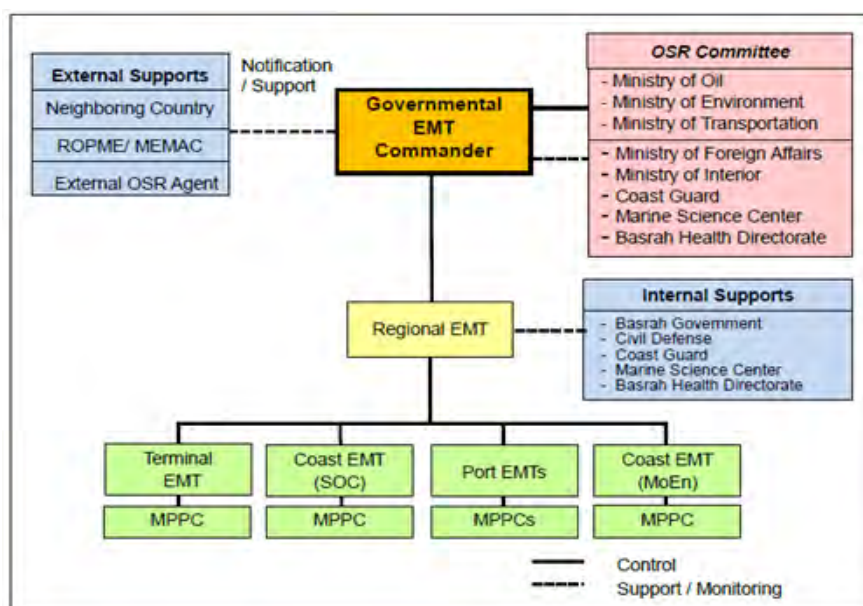


Figure ES2.2-4 Tier 3 OSR scheme

Tier 3 Emergency Operation Center (EOC) is located in the Regional office of Ministry of Environment or other appropriate place depending on the situation of the emergency. Tier 3 EOC consists of a command room, meeting room and offices equipped with the modernized and extensive communication system with neighboring countries and ROPME/ MEMAC, computers, notice boards, furniture, stationeries, etc. necessary for control and management of the whole response operations.

In accordance to the above study, Iraq side will establish the functional EMTs for respective tiers in the responsible organizations as well as the specific Tier 1 EMTs of SOC in early stage of the subsequent phase of the study.

3. Preparation of Legal Framework

In order to make the Terminal OSRP functional and operational, it is essential to develop the relevant national legislative framework for the oil spill prevention and preparedness, as well as strengthen the international and regional cooperation in accordance with the international convention scheme. The Study confirmed the current legal framework concerning oil spill in Iraq and discussed the necessary steps towards the establishment of the legislative framework for the OSRP.

3.1 Preparation of national regulations for oil spill response operation

The basic environmental laws of Iraq, the Law on Protection and Improvement of the Environment (Law No. 27 of 2009) and the Law of the Ministry of Environment (Law No. 37 of 2008), the draft Oil and Gas Law of 2007 and Law of Ports (Law No. 21 of 1995) clearly requires the State and the owner of the project to prepare oil spill response plans in either the national, regional or facility levels.

The International Maritime Organization (IMO) has been introducing various kinds of international cooperation measures through the international conventions, and in the field of the marine environment protection from oil pollution, the measures are classified according to the three categories; a) Pollution Prevention, b) Pollution Response, and c) Liability and Compensation.

In order to establish the oil pollution prevention and response system in Iraq, it is necessary to further enact individual laws and regulations, which provide the legal basis with more explicit rules, and incorporate them into the country's current legal system. The laws and regulations to be prepared are summarized as follows.

- (1) Law on prevention of marine pollution and marine disaster and its ordinance for enforcement;
 - Role and responsibilities of the competent authorities
 - Detail requirements for response operations and procedures
 - Authorization / approval procedures
- (2) Relevant laws and regulations, which shall be referred to during the response operations, such as;
 - Waste management for treatment and disposal of the recovered oil and other wastes
 - Dispersant selection and approval procedures
 - Operators working conditions and hours, protection gears, handling procedures for hazardous wastes, etc.
 - Community health and safety
 - Wildlife protection and rehabilitation
- (3) Law on liability for oil pollution damages, which defines claim procedures, clear definition of admissible claims, etc.

3.2 Strengthening of International Cooperation

3.2.1 Oil Spill Response Planning

(1) International Conventions for Oil Spill Prevention and Response

Primary conventions established in the past decades which can be used as reference to create oil spill response plan are as follows:

- International Convention for the Prevention of Pollution from Ships -Annex I/II (MALPOL 73/78)
- International Convention on Oil Pollution Preparedness, Response and Co-operation 1990 (OPRC 90)

Iraq has not ratified the above conventions yet, however, domestic approval process is now proceeding. It is recommended to promote the domestic process continuously, obtain approval and ratify the relevant conventions promptly.

(2) Regional Cooperation - ROPME

Iraq has ratified the Kuwait Regional Convention for Co-operation on the Protection of the Marine Environment from Pollution; however, its activity has been suspended for years. It is said that the concerned authority is engaging in dialogue with other ROPME contracting states, and reactivated the ROPME membership in 2009. It is essential for Iraq to strengthen the regional cooperation and establish the national plan in concert with related countries and organizations.

(3) Incorporation international/regional conventions into national law

After ratification, it is important that those international conventions and regional

agreements are incorporated into the national law of Iraq, thus providing the required explicit rules on institutional, administrative, regulatory and penal measures in the event of major spill occurrence.

(4) International Convention for Compensation

Iraq has not ratified any of the international compensation regimes such as the 1992 Civil Liability Convention, the 1992 Fund Convention or the 2003 Supplementary Fund Protocol. Whether Iraq is to ratify these conventions or not, it is quite essential that crucial compensation scheme and legal liabilities in the context of national legislation be defined.

(5) Benefit of ratification of CLC

Failure to ratify the international compensation regime can cause problems for all parties in the event of a major spill since there will be great uncertainty over the availability of funds to pay for prompt clean-up and to compensate victims such as fishermen.

Since there is no cost attached to ratifying the 1992 CLC, IMO strongly recommends the ratification of at least the 1992 CLC.

3.2.2 Terminal Operation

(1) Port State Control (PSC) - Riyadh MoU

Importance of the PSC for the maritime safety operation and pollution prevention has been widely recognized and the regional agreements, MoUs, cover much of the world. It is important to establish the PSC system which is consistent with the regional investigation system, including information sharing. Joining the regional agreement of Riyadh MoU and establishing a harmonized system within the Gulf region is recommendable.

(2) Role of the flag state

Ships that fly the flag of any State that has not ratified the relevant conventions would not be exempted from port States inspection because the principle of no more favorable treatment would be applied. A flag State needs to carry out a survey and grant a certificate in accordance with international certification requirements.

(3) International oil export terminal

It is necessary to comply with the international maritime control regime in order to operate the international oil export terminal.

3.3 Preparation of Legislative Framework for OSRP

In order to develop the relevant legislative framework and promote the international / regional cooperation for OSRP, the roadmap for achieving the purpose is shown as follows.

	Year	2012	2013	2014
A	National Legislation			
	1) Integral system of National Contingency Plan	██████████		
	2) Authorization Procedures for OSRPs	██████████		
	3) Relevant laws and regulations, which shall be referred to during the response operations	██████████		
	4) Law on liability for oil pollution damages		██████████	
B	International Cooperation			
	1) Regional cooperation with ROPME/MEMAC	██████████		
	2) Ratification of IMO Conventions - MARPOL, OSRP - Law on civil liability for oil pollution damages		██████████	██████████
	3) Port State Control	██████████		

Figure ES3.3 Roadmap for preparation of legislative framework

4. Environmental and Social Sensitivity of the Region

The study aims to investigate and identify the environmental and social sensitivity of the Fao Peninsula region, which might be affected by the potential oil spill, and then, such information is reflected in the development of the effective protective plans for the areas in the OSRP.

The study procedure is shown below.

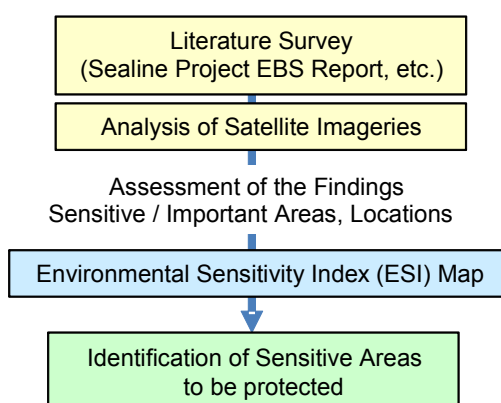


Figure ES4-1 Study procedure

4.1 Investigation of Environmental and Social Baseline

The environmental and social baseline (EBS) information was collected from the literatures

published and/or collected by the study teams, which include the Sealine Project EBS Report (Jul. 2011), etc.

In addition, the analysis of satellite imagery provided other information such as geological features, land use and distribution of terrestrial vegetation as well as candidate sea grass beds in the region.



Figure ES4.1-1 Sealine project EBS report

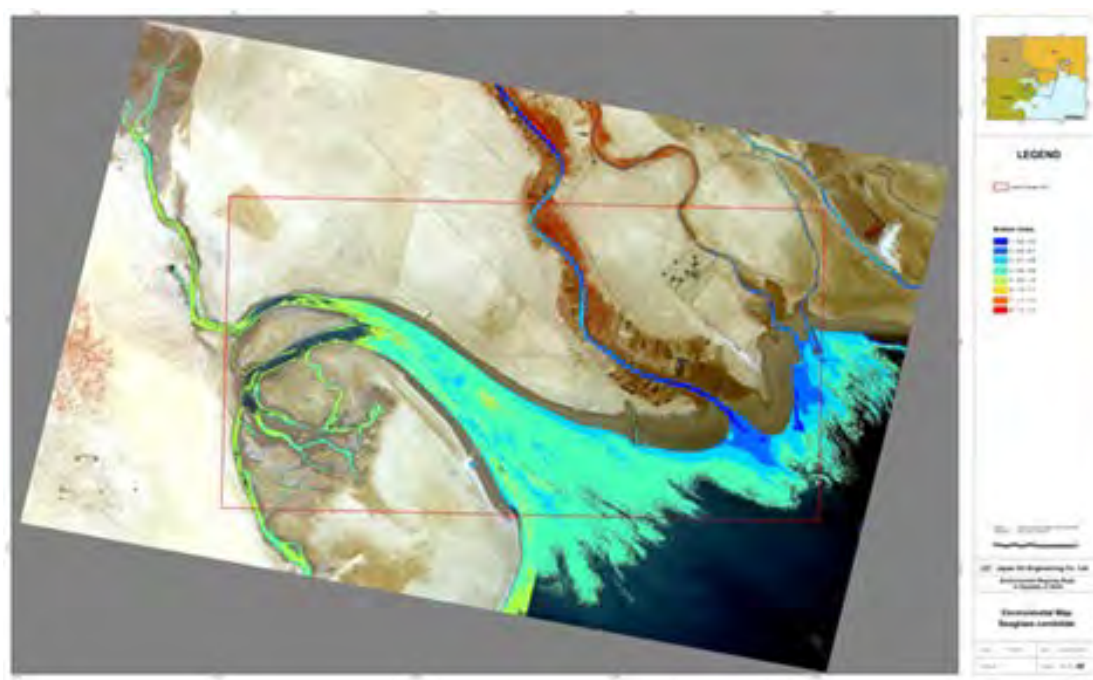


Figure ES4.1-2 Satellite imagery

4.2 Environmental and Social Sensitivity (ESI) Map

The areas subject to the survey are categorized into 6 (Area A~F) depending on the current situations/ use of economic activities.

ESI map was drafted preliminarily using GIS technique based on the findings of the above baseline investigation as follows, which indicates the shoreline type, human-use resource and activity as well as terrestrial and marine wildlife in the each area categorized.



Figure ES4.2-1 Survey area/ shoreline type and feature

5. Outcomes of Updated Oil Spill Modeling

5.1 Updating trajectory model in consideration of outflow from Shatt al Arab River

In order to acquire more accurate and reliable oil spill drifting data, the oil trajectory model was updated using the outflow from the river. The flow speed of the Shatt al Arab River in summer and winter applied to the modeling is 6,000 m³/s and 2,000 m³/s respectively. The modeling predicted the effects of the outflow from the river on the sea area during summer and winter as follows.

The flow speed of the river varied from 0.5~1.0 m/s during summer and 0.1~0.3 m/s during winter. The sea areas influenced by the river flow during each season are shown below, which predicts the range of 15 km and 25 km from the river mouth.

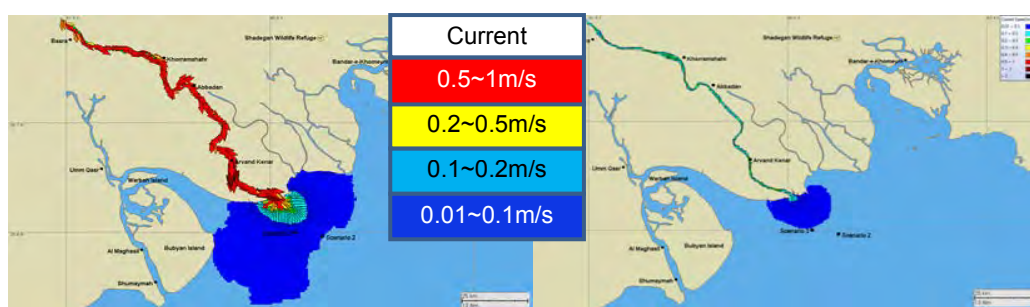


Figure ES5.1 Effects of Shatt Al Arab river flow (L: summer, R: winter)

The above modeling estimated certain effects of the outflow of the river on the sea current in the northern area of the Gulf. Accordingly, it is expected that the impact on the sea current could alter the prediction of the oil trajectory in the coastal area of the Gulf.

5.2 Detailed Trajectory Modeling

The oil on water subject to the trajectory modeling in this phase is to be the slicks of above 10µm (0.01mm) thickness, which might affect the marine and coastal environment of the region. The results of detailed trajectory modeling for each scenario are summarized as follows.



Figure ES5.2-1 Oil slick subject to the modeling

【Scenario1】 An instantaneous release for 10 min of 20 tons of oil spill at south of BOT

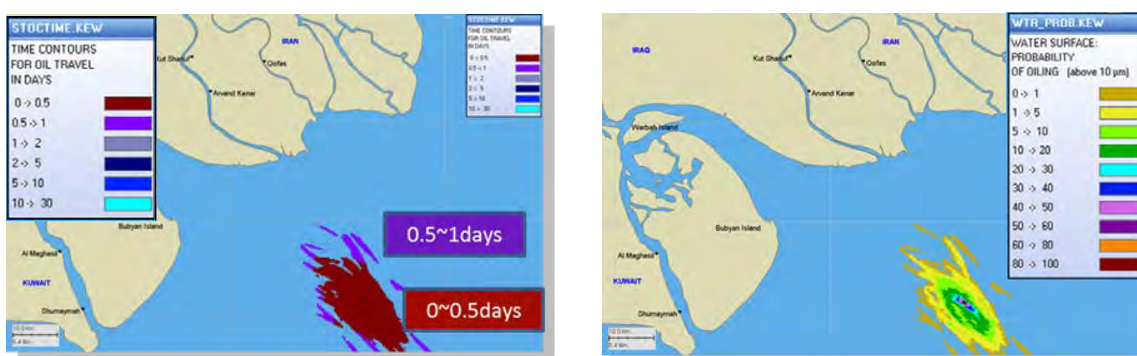


Figure ES5.2-1 Time contour for oil travel and probability of oiling during winter (Scenario 1)
 The modeling indicated that none of the trajectories made contact with the shoreline in this scenario.

【Scenario2】 A continuous release for 12 hours of 20 tons of oil spill at south of BOT

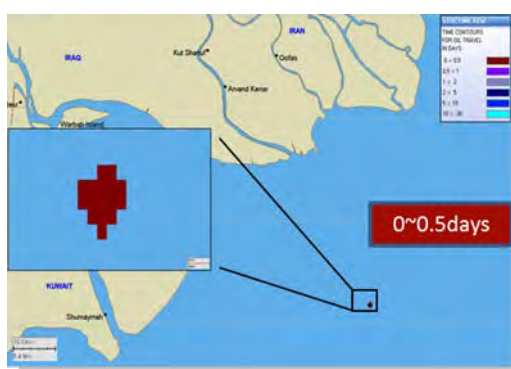


Figure ES5.2-2 Time contour for oil travel during winter (Scenario 2)

The modeling indicated that none of the trajectories made contact with the shoreline.

【Scenario3】 An instantaneous release for 10 min of 100 tons of oil spill at south of BOT

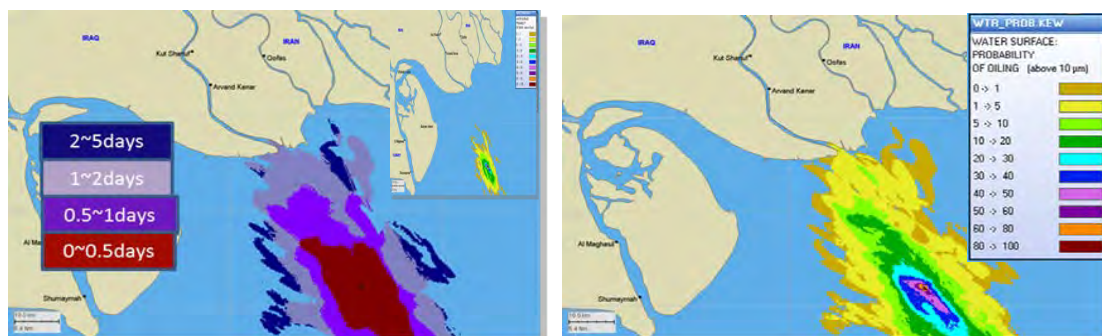


Figure ES5.2-3 Time contour for oil travel and probability of oiling during winter (Scenario 3)

No probability of oil shoreline contact was predicted during summer. However, a 5% probability of shoreline contact within a couple of days was predicted during winter.

【Scenario 4】 An instantaneous release for 10 min of 500 tons of oil spill at south of BOT

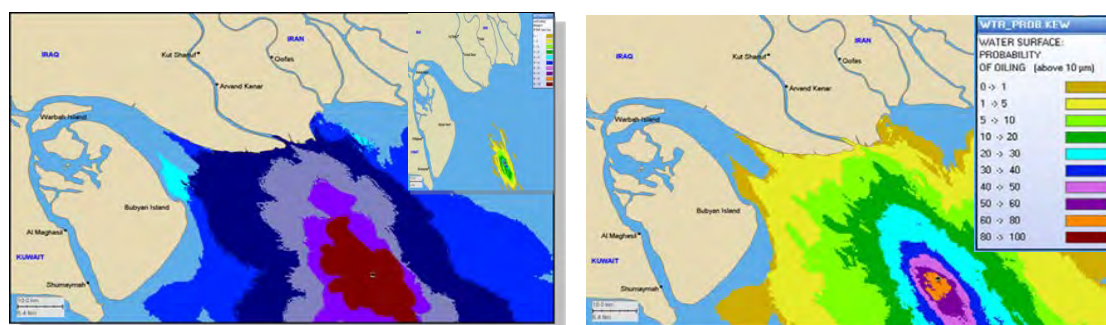


Figure ES5.2-4 Time contour for oil travel and probability of oiling during winter (Scenario 4)
 2% and 4% of oil shoreline contact probability within 2~5 days was predicted during summer and winter respectively.

【Scenario 5】 A continuous release for 12 hours of 2,500 tons of oil spill at south of BOT

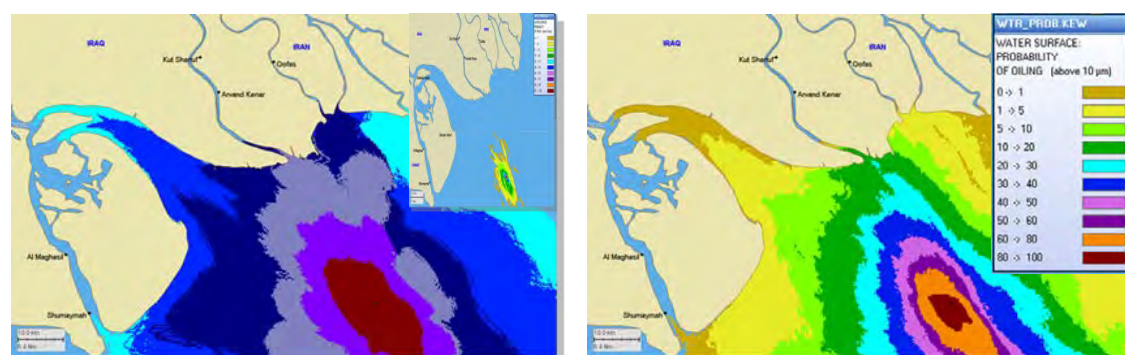


Figure ES5.2-5 Time contour for oil travel and probability of oiling during winter (Scenario 5)

During summer, 2~4% of shoreline contact probability within 3~5 days was predicted. However,

high probability (20~30%) in wider range of shoreline within 2~5 days was predicted during winter.

5.3 Detailed Weathering Modeling

The oil behavior on water is affected by the maritime and weather condition. Therefore oil continues to change its physical state with time. This effect of surrounding condition on oil is called “weathering”.

Basrah regular crude oil evaporates 50% after 2 days (60% evaporation after 10 days). Half volume of the spilled oil would be the target to be recovered. However, after oil evaporation of approximately 15%, oil emulsification was predicted to start and the targeted oil volume for recovery will become large due to the volume expansion by oil emulsion formation.

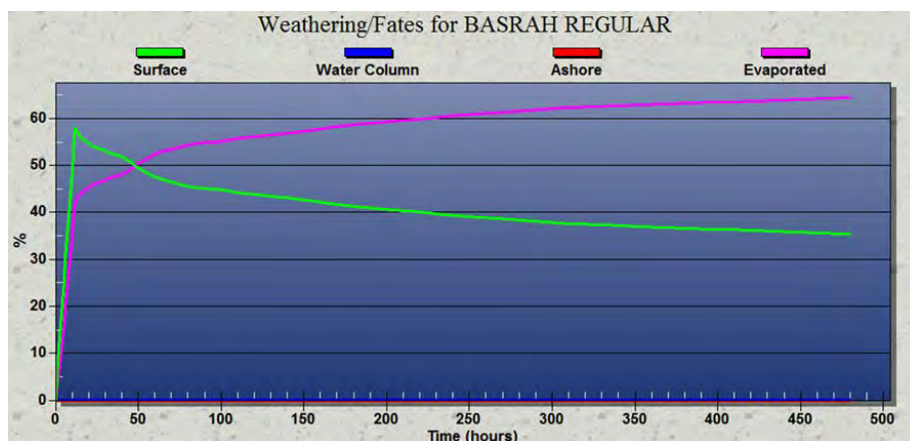


Figure ES5.3 Weathering/Fates for Basrah Regular Crude

5.4 Effects of Oil Viscosity Change in Time and Response Measure

Viscosity of oil released on water changes in time due to weathering effect depending on the surrounding sea and weather conditions as well as water temperature.

Generally, the dispersant is applicable for the oil below 2,000cSt of viscosity. The ordinary type of containment and recovery with low-medium viscous pump and skimmer is applicable for the oil below 8,000cSt. For recovery of above 8,000cSt viscosity of oil, high viscosity type of skimmer with high viscous pump and skimmer is required additionally.

In case of medium/ large spill, the time limit after spill for effective response (containment and recovery and dispersant) for Basrah regular crude were discussed according to the increased viscosity of oil due to weathering as follows.

Table ES5.4 Applicable response measures and time limits for effective response

Response measures	Wind speed: 3m/s (Calm)		Wind speed: 7m/s (Slightly Stronger)	
	Summer	Winter	Summer	Winter
Containment and Recovery	3 days	2.5 days	1.5 days	0.5 day
Use of Dispersant	2 days	1.5 days	9 hours	6 hours

6. Oil Spill Impacts on Environmental and Social Sensitive Areas

6.1 Possibility of Oil Exposure to Sensitive Areas

The modeling for the worst case scenario (100 tons of crude oil spill from the existing subsea pipeline at 10 km from KAAT) predicted a certain possibility for the slicks to drift in the north direction and contact with the Iraqi, Iranian, and Kuwaiti shorelines as well as the upstream oil slick in the river more than 10 km from the river mouth in spite of the massive river current. Probabilities of water surface and shoreline oil exposures are shown below.

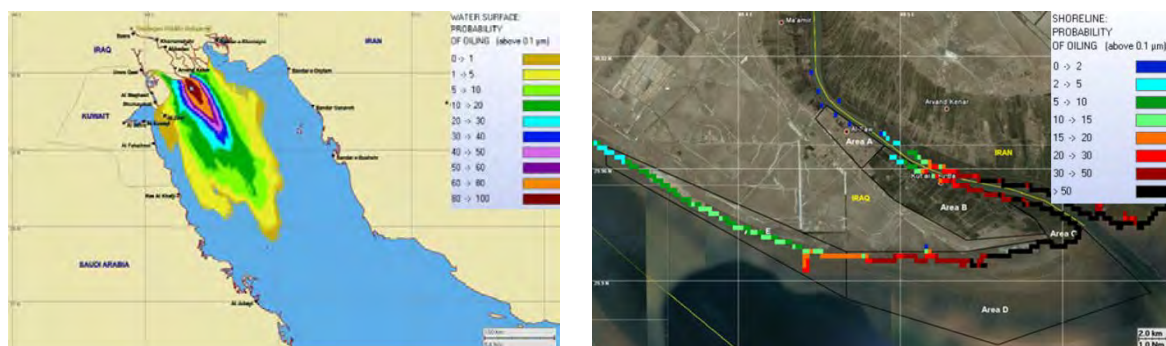


Figure ES6.1 Probability of water surface/ shoreline oil exposure

According to the modeling, the predicted probabilities of oil exposure to each shoreline area are as follows.

Table ES6.1 Probability of shoreline oil exposure

	Probability of oil exposure
Area A	0 - 5%
Area B	5 - 50%
Area C	>50%
Area D	15 - 50%
Area E	2 - 30%

6.2 Applicable Protective Measures for the Sensitive Areas

In case of large scale of oil spill, in spite of initial offshore protective efforts at the event site, environmental sensitive shoreline which could be affected by the spilled oil shall be protected effectively as second protective tactics. When the sensitive shoreline has been exposed by oil in spite of the efforts such as operation of offshore protection and shoreline protection, the shoreline contaminated by oil shall be cleaned up for environmental restoration through appropriate method(s).

Applicable shoreline protection and shoreline cleanup methods for sensitive areas are as follows.

Table ES6.3-1 Shoreline type and applicable shoreline protection methods

Methods	Mud Beach	Intertidal Mudflat	Inlet/ Intertidal Creek*	Saltmarsh
Deflection Booming	○	○	○	
Exclusion Booming	○	○	○	○
Shoreline Barriers	○		○	○
Loose Sorbents	○		○	○
Oil Recovery	○	○	○	○

* Inlet/ Intertidal Creek involve River Mouth and Irrigation Canal.

Table ES6.3-2 Shoreline type and applicable shoreline cleanup methods

Cleanup Methods	Mud Beach	Intertidal Mudflat	Inlet/ Intertidal Creek*	Saltmarsh
Natural Recovery	○	○	○	○
Manual Removal	○	○	○	○
Mechanical Removal	○	(○)		
Sorbents	○	○	○	○
Vacuum Recovery	○	○	○	○
Bioremediation	○	○	○	
Water/Steam Cleaning				
Chemical Remediation				

* Inlet/ Intertidal Creek involve River Mouth and Irrigation Canal.

For selecting the most appropriate protective/ cleanup measure(s) among the several applicable methods to minimize environmental and socio-economic damage by the event, it is required to consider seriously the effects of the candidates from various points of view. Net Environmental Benefit Analysis (NEBA) serves as a decision-making for selecting the proper solution for the purpose. NEBA is not a new assessment method. It is one of the processes being practically used in reaching a wise solution for spill response based on common practices and incident experience by comparing the “Advantages” and “Disadvantages” of response measures from an ecological and socio-economic point of view. A practical process for decision-making for the solution by NEBA is illustrated below.

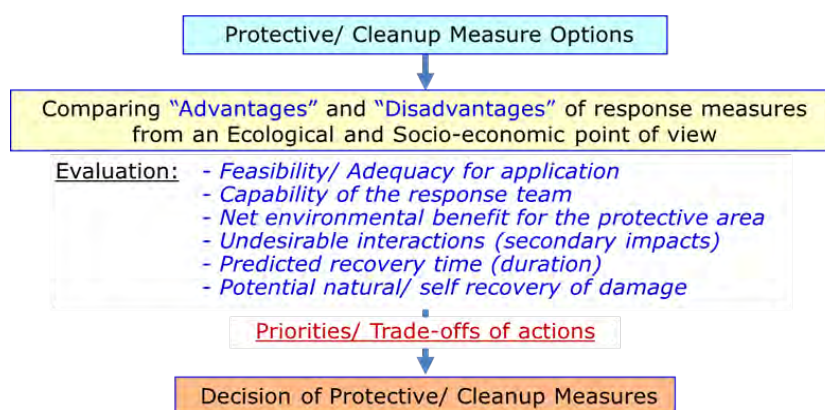


Figure ES6.3 Process of NEBA

The effective protective/ cleanup measures, as well as combination of two or more applicable methods, for the respective sensitive areas shall be selected adequately among several candidates depending on the situation of the event and the targeted area/ location for protection. The further study shall be conducted properly by the both teams through the practical NEBA in accordance with the characteristics/ type and environmental/ social sensitivity of the area, priority for protection as well as adequacy/ operability of the measure at the site and capability of the response team.

7. OSRP for Crude Export Terminal

7.1 Introduction

The Oil Spill Response Plan for the Crude Export Facility (Terminal OSRP) aims to define the response strategies, organizations, procedures and protective operations to minimize the effects of potential oil spill incidents associated with the operations of the crude export facility including other vessels plying in the territorial waters of the Republic of Iraq effectively and safely.

The Terminal OSRP encompasses the territorial waters of Iraq in the Gulf off the Fao peninsula between the boundaries of neighboring Iran and Kuwait including the operational areas of the crude export terminals and the sea-lanes toward Shatt Al-Arab and Khor Abd Allah water ways.

7.2. Basic Oil Spill Response Strategy

(1) Responsible organizations

The Terminal OSRP shall address any potential oil spill incident arising from various operations in the covered sea areas. The operator of the crude export facility (SOC), the administrative body for oil spill from vessel operations (GCPI) and the governmental authority for marine and

coastal environmental protection (MoEn) are to be the principal bodies responsible for oil spill response.

These responsible bodies shall organize capable EMT with response resources respectively at the operational sites to respond to the emergency event that could occur in the area.

(2) Tiered response and unified command

The oil spill response is to be made up of 3-tiers designed to appropriately respond to possible emergency situations from facility/local level (Tier 1) through to regional (Tier 2) and country level (Tier 3) such as trans-boundary oil spill depending on the scale and consequence of the event and the response capabilities of the body responsible for managing the event. These are achieved through the joint effort of the responsible body and concerned authorities with dedicated coordination for the responses through a unified command of the emergency response teams comprised of concerned organizations.

(3) Response options

Applicable response strategy for the event shall be selected appropriately depending on the location of the incident, type, properties/ toxicity and volume of oil released and weather and sea conditions as well as capability of the response team. The response options for oil spill have offshore operation and shoreline cleanup for passive “Protection and Cleanup” and “No Response Action” to leave spilled oil to natural weathering/ dispersion.

7.3 Response Organization

The Oil Spill Response (OSR) system in Iraq encompasses three (3) tiers of the response organizations consisting of facility/ site level, regional level and country/ governmental level. The response schemes for each tier and the EMT organization of SOC (BOT) are shown as follows.

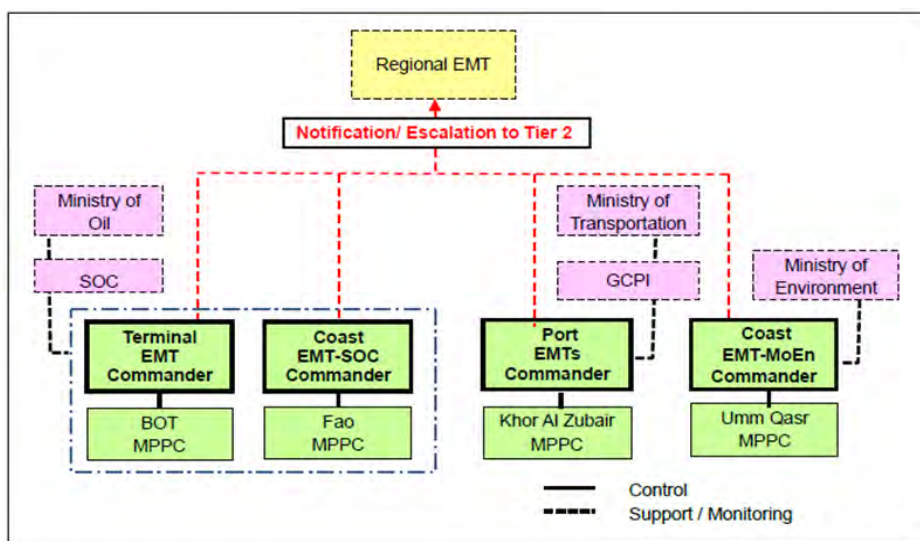


Figure ES7.3-1 Tier 1 Response scheme

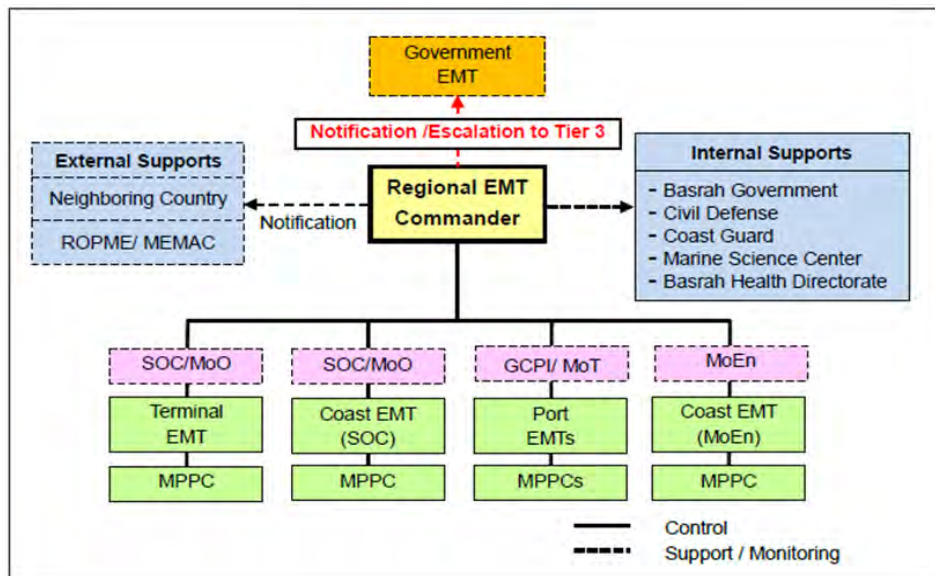


Figure ES7.3-2 Tier 2 Response scheme

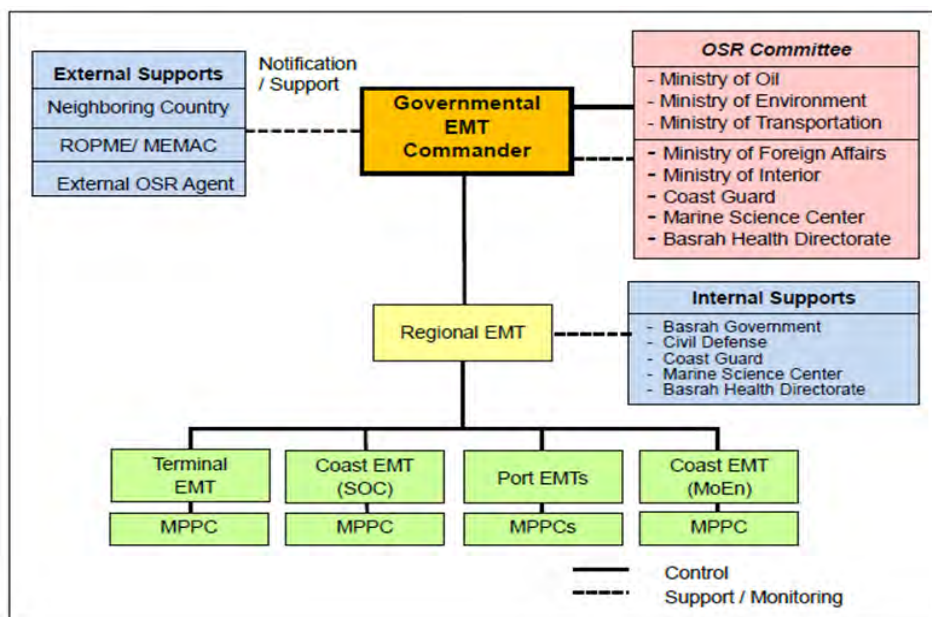


Figure ES7.3-3 Tier 3 Response Scheme

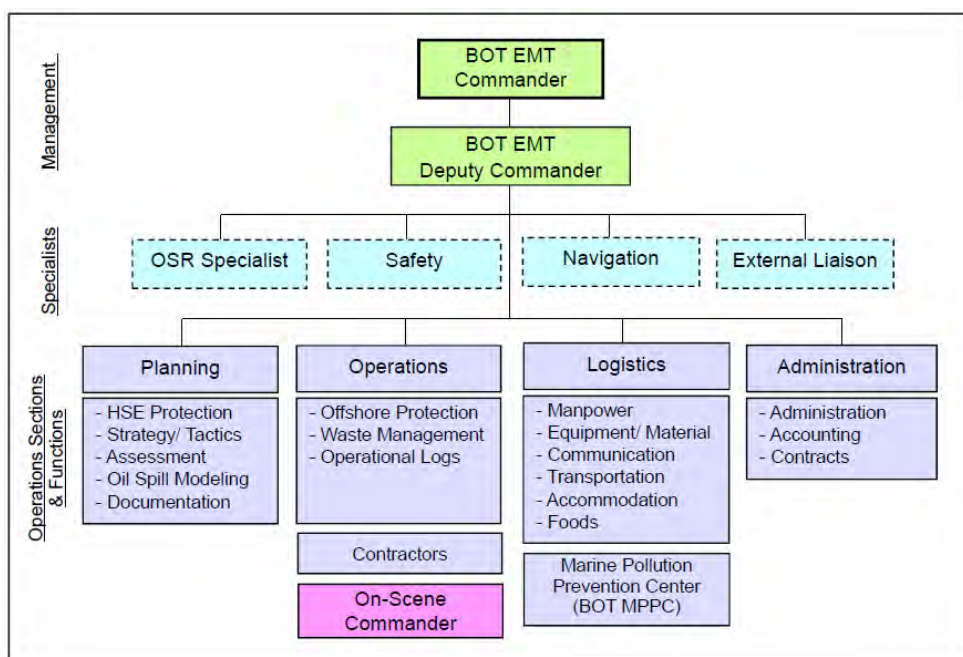


Figure ES7.3-4 EMT organization of SOC (BOT) EMT

7.4 Response Procedure

The procedure consists of several steps of response actions such as an initial reporting/ notification from the observer of the event or person involved in the incident as initial action, calling up of the responsible EMT, planning of applicable response measures depending on the situation of the incident, organization of operational resources and response operations. The procedure also describes the actions to be taken in case the event of spill could escalate to higher response tier.

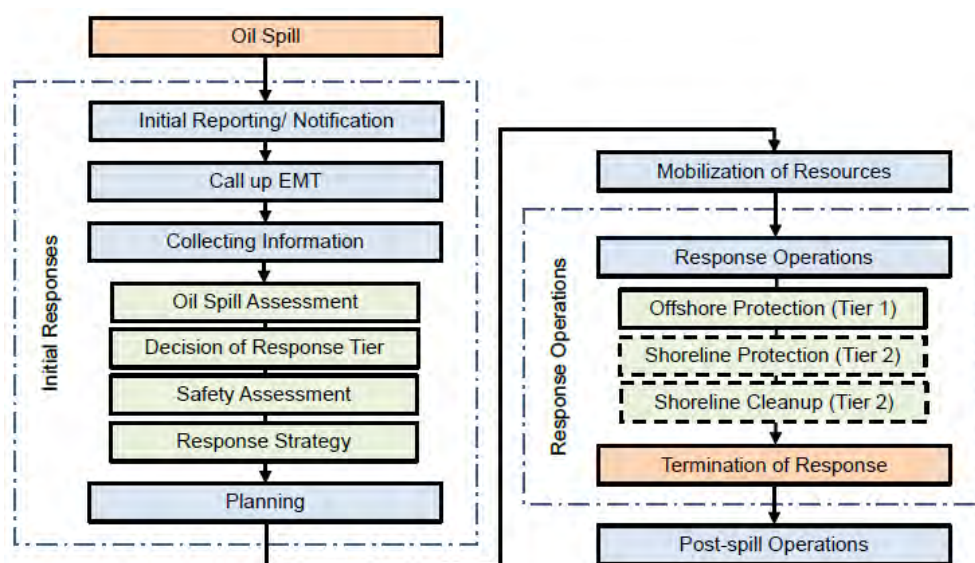


Figure ES7.4-1 General response procedure

The initial reporting/ notification procedure for the oil spill from the crude export facility due to defect/ failure of equipment aboard the facility or the work boat in the operational area is described as follows.

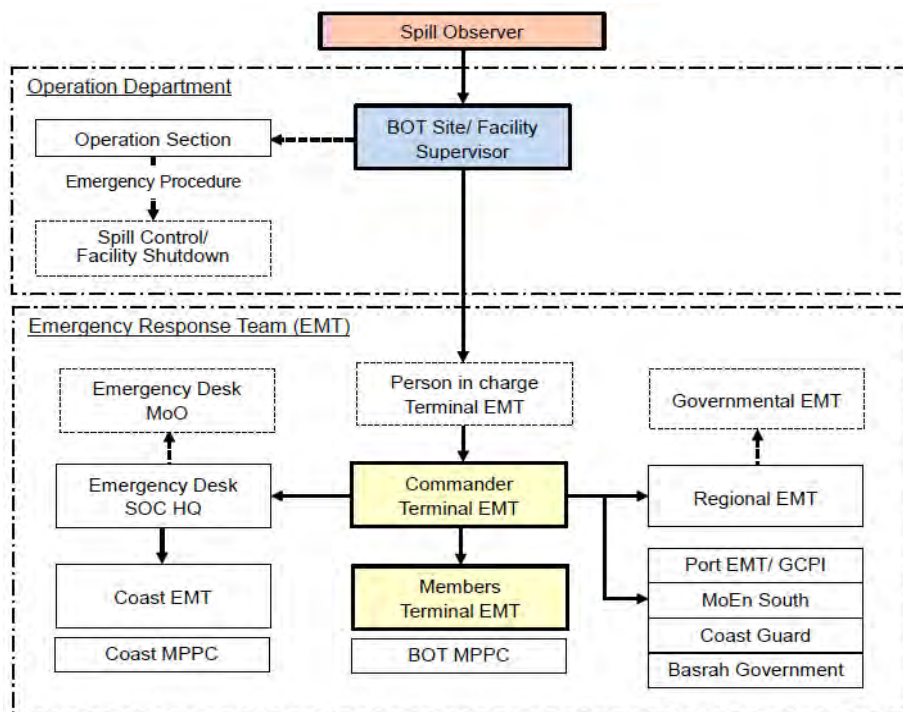


Figure ES7.4-2 Initial reporting and notification

The Planning Section of the EMT shall confirm the information reported initially by the observer and/ or operator and collect further information necessary to provide applicable response tactics/ measures for the event, which includes the location and source/ cause of oil spill and oil spill situation as well as weather and sea conditions. The EMT shall decide the applicable response tier of the oil spill according to the above information about the situation of the event. Based on the response tier decided, the responsibility for entire response operations to be undertaken for the incident shall be assigned/ transferred to capable EMT respectively, i.e. Tier 1: Terminal EMT or Port EMT or Coast EMT, Tier 2: Regional EMT, Tier 3: Governmental EMT.

7.5 Response Operations

The response operations for the oil spill shall be implemented immediately by mobilizing the response resources in accordance with the Operation Plan developed by the Planning Section of the EMT. The Operation Section of the EMT shall be responsible for control of the protective operations at site of the incident.

(1) Monitoring/ Natural Weathering (No Response Action Option)

No active response is advisable for the spills as follows.

- Extremely small spill with a thin sheen
- Highly volatile oil (i.e. diesel, gasoline), which is expected to rapidly break up due to evaporation and natural dispersion in water
- Volatile oil with toxic vapor (i.e. condensate, etc.)
- Rough weather/ sea conditions

(2) Offshore Protection

Deflection and Physical Dispersion

The thin oil films or sheens or highly volatile oil such as condensate can be physically deflected away from the spill source (facility or ship) by sweeping the surface with fire monitors installed onboard or fixed on the structure.

Containment and Recovery

The objective of containment is to concentrate the oil on water using “Mobile Containment Boom” to achieve a slick thickness that permits recovery.

Dispersant

Dispersant chemicals are used to promote the formation of oil droplets in order to accelerate the natural dispersion and biodegradation of oil spilled on water. Application decisions shall be based on estimating the minimum effective dosages of oil in water to minimize possible impacts on the shoreline with environmentally or socially sensitive areas.

(3) Shoreline Protection

The effective measures for shoreline protection of the sensitive areas along the shoreline from oil slicks includes

- Barriers, exclusion, deflection of oil slick with mobile floating booms
- Adsorption of oil with sorbents
- Oil recovery

(4) Shoreline Cleanup

Shoreline cleanup aims to accelerate the recovery of the oiled shoreline areas. The cleanup methods selected to meet the objective shall be compatible with the shoreline type (characteristics of the shore area) and the oily exposure conditions (type and volume of oil).

The applicable cleanup measures for the shoreline of Fao Peninsula are as follows.

- Natural recovery
- Manual and mechanical removal
- Chemical or biological remediation

In addition to the above protective measures, the response operations include wildlife protection, waste management, and health and safety considerations for the response personnel.

Then, upon completion of the protection and cleanup activities at the sites, the responsible EMT Commander for the each site shall terminate the response operations.

8. Oil Spill Response Resources

8.1 General

Oil spill response resources are comprised of oil spill response equipment and materials, and associated operating manpower. The availability of appropriate equipment is one of the most important elements in oil spill response activity, and the effective response activity is achieved by employing suitable response techniques and using proper equipment and manpower for oil spill event.

8.2 Policy and Study Basis

The deployment policy of the response resources are assumed as follows.

- First priority for offshore protection to be undertaken initially on water should be “Containment and Recovery” with containment booms and oil skimmers.
- As second priority, dispersant chemical should be applied for offshore operation.
- The above response equipment for small and medium oil spill events should be provided by SOC and GCPI.
- The response equipment to be used for shoreline protection and shoreline cleanup operations should be mobilized from all the existing stockpile bases in Iraq.
- Response equipment and materials required for Tier 1 and Tier 2 oil spill shall be fully provided by responsible organizations.
- For Tier 3 oil spill, additional response equipment required for such event should be mobilized from external support organizations such as MEMAC, PAJ, OSRL, etc.

8.3 Selection of Response Equipment

In order to confirm the present response equipment capability of Iraq, the data of currently available response equipment was collected from SOC and GCPI. Most of Iraq oil sectors including oil production, pipeline, and refinery companies are equipped with stockpiles of oil spill response equipment for inland oil spill including river and other water bodies.

In case of Tier 3 large oil spill, additional response resources will be mobilized from the external support organizations upon the request from Tier 3 response team in Iraq. The information such as contact address of the external organizations and lists of the equipment

available at the organizations are collected. The external support organizations are

- MEMAC
- Oil Spill Response Limited (OSRL)
- Petroleum Association of Japan (PAJ)

Based on the above investigation and discussions and the equipment necessary for protection of the environmental and social sensitive areas which might be affected by the potential oil spill, the major response equipment and materials to be procured were selected for offshore operation.

8.4 Recommendations

Further discussions on the following issues are needed in order to develop the mobilization scheme of the domestic response resources available for the OSRP.

- ✓ Mutual co-operative agreement among the related organizations for mobilization of the resources for response operation
- ✓ Contact points and names of the persons in charge of the event
- ✓ Mobilization methods and procedures for equipment and materials
- ✓ Materials standardization for response equipment such as hose fitting connectors and sizing
- ✓ Periodical training programs for co-operation

In addition to the above, the following issues shall be discussed among the concerned organizations.

- ✓ Listing up of the equipment available at domestic stockpiles and the additional equipment to be procured by the respective EMTs for shoreline protection and beach cleanup available
- ✓ Procurement of the multi-purpose emergency boat(s) to be used for the potential emergency cases such as oil spill, fire, rescue and other marine incidents/ disasters
- ✓ The monitoring and track system using an aircraft is recommended to introduce to Tiers 2 and 3 OSRP

9. Manpower and Training

In order to improve and enhance the knowledge and skills for the oil spill response operations, a suitable training program shall be established in the companies and the related organizations.

9.1 Capacity Building for Response Organization and Personnel

All personnel and organizations involved in the oil spill response shall be trained regularly through various exercises to ensure their skills are enhanced and/or maintained sufficiently so that effective response and control can be provided during emergency operations.

The International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990 (OPRC) calls to develop a comprehensive training program in the field of oil pollution preparedness and response including the availability of expertise for the development and implementation of training programs. In this regard, it was decided to develop three model training courses aimed at the following:

- Level 1: First Responder (Operational Staff)
- Level 2: Supervisors and On-scene commanders
- Level 3: Senior managers and Administrators

9.2 Oil Spill Response Exercises and Drills

The Oil Spill Response Plans have to be reviewed and tested periodically to assess their adequacy through the well-programmed exercises and drills. Planning and conducting the practical exercise program, reviewing the results and updating the OSRP shall be incorporated into the OSRP.

(1) Objectives of the exercise

Assessing the adequacy of a contingency plan for:

- Realistic assessment of the sources and the risks of spill
- Priorities for protection
- Strategy for protecting and cleaning
- Organization and the responsibilities
- Levels of equipment, materials and manpower
- Temporary storage sites and final disposal routes
- Alerting and initial evaluation procedures
- Effective communication between shore, sea and air
- Ensuring nothing significant is found lacking in the OSRP
- Compatible with plans for adjacent areas and other activities

(2) Exercise Categories

A series of annual exercises shall be carried out to improve personnel skills and maintain their awareness, and provide management an opportunity to assess the effectiveness of the response plans. The following exercises are to be planned.

- Notification exercises:
- Tabletop exercises

- Equipment deployment exercises
- Incident management drills

9.3 Training Activities in Phase 2

In the Phase 2 of the Project, the following activities have been conducted:

(1) OSRL Training Seminar

Three of the member of the working committee participated in the Oil Spill Response Training Seminar for IMO Level 3 course held on November 15–17, 2011 at Bali, Indonesia. The contents of the seminar are as follows.

Day 1	Day 2	Day 3
<ul style="list-style-type: none"> • Fate and behavior of spilt oil • Environmental, social and economic sensitivities • Environmental assessment exercise • Planning process • Response strategies • On-scene finances • Table-top exercise 	<ul style="list-style-type: none"> • International co-operation • Tracking and assessment • Quantification and tracking exercise • Management realities • Case study • Protecting your people • Hazard identification exercise • Waste management • OSRO's, contractors and Volunteers 	<ul style="list-style-type: none"> • Claims and compensation • Spill termination and post-spill monitoring • Lessons learned • Media management • Press conference exercise • Course debrief • Presentation of certificates

Followings are the comments of the participants for the training seminar.

- Each of the participants had a basic knowledge on oil spill response; however, they could improve their awareness by attending the seminar.
- The sessions/topics which the participants find the most helpful are:
 - Environmental and social sensitivity
 - Spill response strategies
 - Fate and effect of spilled oil
 - Waste management
- Every participant finds the exercise/case studies in the seminar useful.
- The three-day-course is not enough and additional few days with practical drills/exercises are preferable.
- It was a valuable experience to attend the training course where many participants from various countries and organizations gathered. We can share information and/or challenges facing each organization and exchange opinions with each other including

the lecturers.

(2) Case Study - Demonstration of Tabletop Exercise in the Workshop Meeting

In the workshop meeting, tabletop exercises with several incident scenarios are demonstrated by Iraqi committee members who have participated in the OSRL training seminar;

- Scenario 1: Oil spill from Loading hose of SPM system –Tier 1
- Scenario 2: Collision of Cargo ship in the Iraq territorial water –Tier 1
- Scenario 3: Collision of Taker near the Basra Terminal–Tier 2

10. Financial Planning

10.1 Budget

Financial resource is one of the most essential issues in the successful implementation of the OSRP to assure that the necessary budget for the costs/ expenses is available for response operations as well as for compensation for the probable environmental and economic damages arising from the oil spill event.

The financial planning in this phase has been prepared considering the procurement of offshore response equipment, as a first stage of financial planning. The following major matters on Tiers 1 and 2 level of budget shall be resolved to ensure a more effective and powerful OSRP is implemented.

- Procurement cost of equipment and materials for shoreline protection and beach cleaning
- Initial Cost for building and furniture for stockpile bases (MPPCs)
- Operation Cost for manpower of stockpile bases (MPPCs)
- Maintenance Cost for equipment and housing of stockpile bases (MPPCs)
- Response Training Cost for annual manpower training program

The Study will furthermore discuss the finances for the response operations and compensation for the consequences of the possible large oil spill (Tier 3 level) to be provided by the responsible bodies and the relevant ministries. In the discussion, the policy of the country and companies regarding assurance of the finances for emergency event will be confirmed in the next phase of the study.

10.2 Compensation Scheme

In the international compensation scheme, compensation for pollution damage is governed by the 1992 Civil Liability Convention (1992CLC), the 1992 Fund Convention (1992Fund) and

2003 Supplementary Fund Protocol (2003 Fund). The principle of the scheme is about strict liability, regardless of whether or not the tanker causing the spill was at fault. Claimants can therefore receive compensation promptly, without the need for lengthy and costly litigation. The international compensation scheme creates a three-tier system of compensation as shown below.

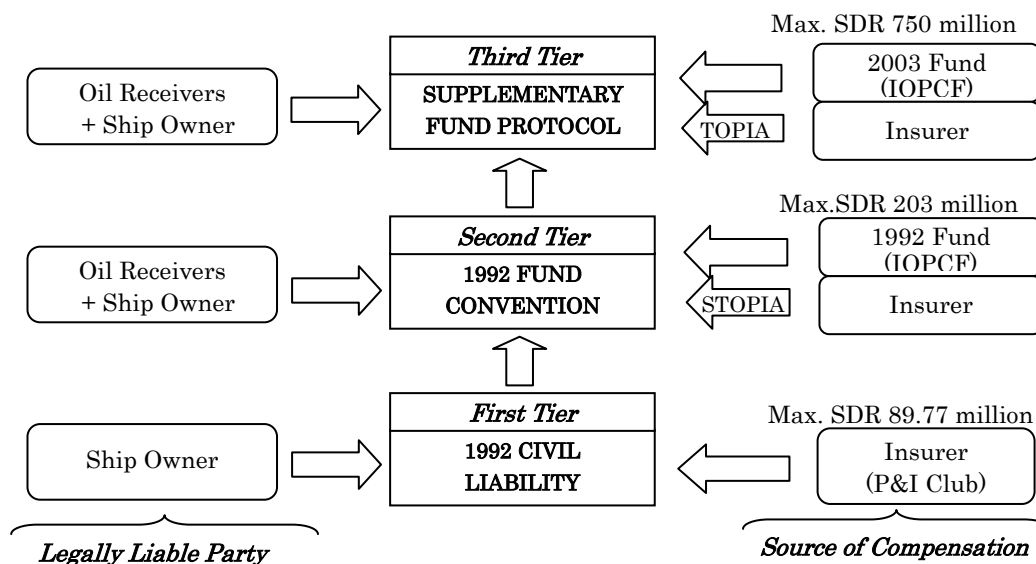


Figure ES10.2-1 International compensation Scheme

The amounts of compensation available under the 1992 CLC and 1992 Fund Convention from 1 February 2007 are set out and illustrated below. Note that the limits of the compensation are expressed in Special Drawing Rights (SDR), which is the currency created by International Monetary Fund. The SDR currency value is SDR1 = US\$1.555 as of January 2011.

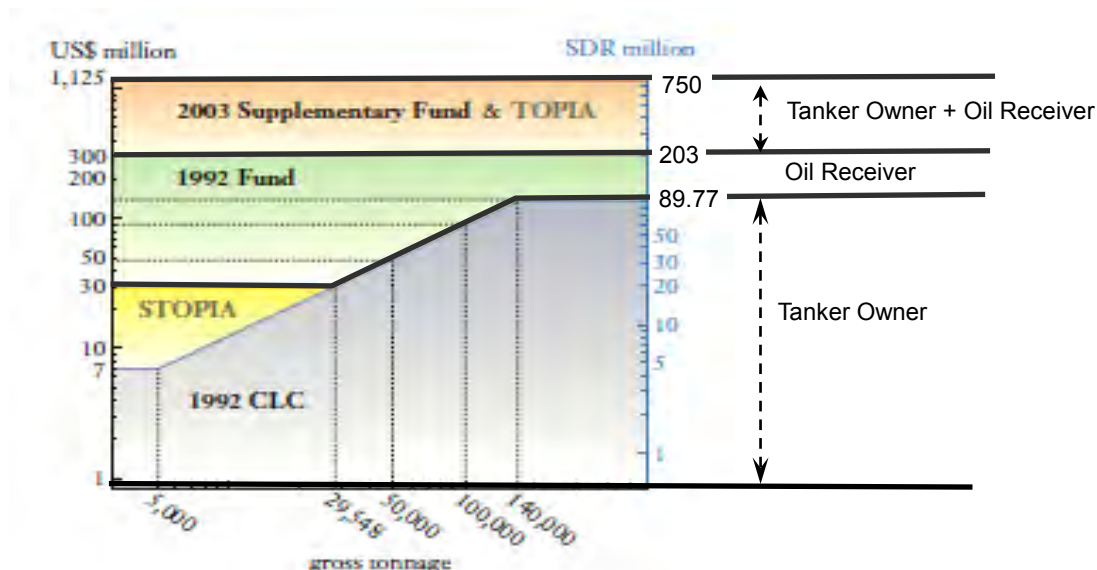


Figure ES10.2-2 Limits of compensation under the international compensation regime

Whether Iraq is to ratify these conventions or not, it is quite essential that crucial compensation scheme and legal liabilities in the context of national legislation be defined. Failure to ratify the international compensation scheme can cause problems for all parties in the event of a major spill since there will be great uncertainty over the availability of funds to pay for prompt clean-up and to compensate victims in the affected region such as fishermen.

Since there is no cost attached to ratifying the 1992 CLC, IMO strongly recommends the ratification of at least the 1992 CLC.

11. Action Plan for Establishment of Terminal OSRP

The scope of study/ works and practical schedule in the subsequent phase of the study and works for achieving the goal, which is the establishment of the functional Terminal OSRP prior to completion of the Sealine Project, is proposed below.

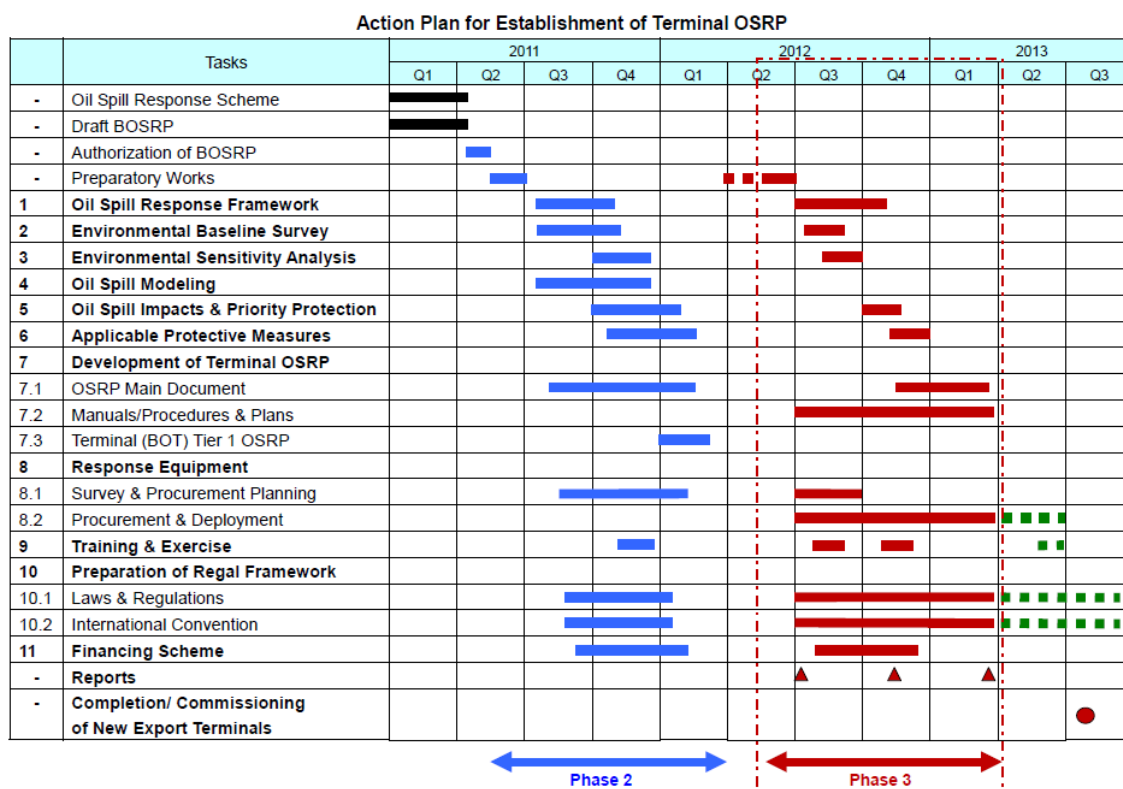


Figure ES11 Proposed schedule for establishment of Terminal OSRP

12. Conclusion and Recommendation

(1) Oil spill response scheme

The possible oil spill in the territorial water and responsible bodies for respective oil spill cases were confirmed by both study teams. The basic 3-tiered oil spill response scheme depending on the size and probable consequence of the oil spill and a typical organization of emergency management team (EMT) for each tier of oil spill were further discussed in this phase of the study.

The functional EMT organization for respective tiers shall be established in the responsible bodies as well as the roles and responsibilities of the personnel in the organization in order to assure the practicable OSRP.

(2) Legal framework

Necessary supplemental laws and related regulations/ rules for development and authorization and implementation of OSRP as well as finances for preparedness, response operations and compensations for potential damage caused by oil spill have not been prepared sufficiently in Iraq so far.

The study shall continue to discuss the possible preparation of the domestic legal framework and relevant international conventions/ regional agreements. The study shall aim to propose the milestones for achieving the goals considering international requirement for Iraq as well as the neighboring countries in the Gulf region.

(3) Environmental and social sensitivity of the region

Environmental and social sensitivity index (ESI) map covering Fao peninsula region which might be affected by the potential oil spill was drafted by the Japanese study team based on the limited information collected through literature survey and analysis of the satellite imageries.

The draft ESI map shall be finalized based on the further detailed information of the region that will be collected by the Iraqi study team in the subsequent phase for identification of the sensitive/ important area and locations to be protective.

(4) Oil spill modeling

Further oil spill modeling study provided the findings as follows.

- The outflow from Shatt Al Arab River does not affect significantly the general tendency of water current and probable oil trajectory both during the summer and winter seasons in the north-west region of the Gulf.
- The detailed oil spill modeling for various spill volume cases confirmed the minimum spill volumes which could contact to shoreline (Tier 2) and cross the boundary of

neighboring country (Tier 3).

- Modeling of weathering/ fate for oil on water predicted the time limit and property/ contour of oil on water for effective offshore protection to be undertaken in the earliest stage of response operation.

Such information is much helpful for discussion of the effective response strategy for offshore protection as well as response equipment to be provided and mobilized.

(5) Oil spill impacts on environmental and social sensitive areas and applicable protective measures

Probable oil spill impact on the environmental and social sensitive areas along the shoreline of Fao peninsula was studied preliminarily using an environmental and social impact assessment sheet in accordance with the draft ESI map and the probable shoreline oil exposure predicted by the oil spill modeling.

In order to discuss the priority protective area(s) from potential oil spill, further oil spill impact study on the respective sensitive areas shall be conducted in accordance with the finalized ESI map and environmental and social sensitivity/ importance of the areas.

The further study of applicable protective/ cleanup method(s) for each target area shall be conducted properly through the practical method “Net Environmental Benefit Analysis (NEBA)” in accordance with the characteristics/ type and environmental/ social sensitivity of the area, priority for protection as well as adequacy/ operability of the measure at the site and capability of the response team, etc.

(6) Terminal OSRP

- The both study teams recognized that it is important to select preliminarily the applicable protective method(s) for each target area considering the sensitivity, extent of the area for protection, expected effectiveness, recovery period required as well as capability of the responsible EMT.
- The Terminal OSRP (main document) was drafted in this phase, which defines the principal responsible bodies, basic response scheme and organizations of the emergency management team (EMT), response procedure and response operations to be undertaken for minimizing the impacts of the oil spill. In order to finalize the functional and practicable OSRP, further discussion for the functional organization and response procedure shall be made within the responsible bodies and among the organizations to be involved in the response.

In addition, detailed response manuals/ procedures and plans for the response operation shall be developed in the subsequent phase.

- Terminal (BOT) OSRP for Tier 1 oil spill was drafted by Japanese study team according to a strong request of SOC. The Tier 1 OSRP shall address the potential small oil spill (Tier 1) due to inexperienced operations of the new loading system which will be provided by Iraq Crude Oil Export Expansion Project (ICOEEP) scheduled to be commissioned in May, 2012. The draft Tier 1 OSRP shall be finalized properly by SOC and be functional with necessary response equipment before the target day.

(7) Oil spill response resources

A list of primary response equipment required for offshore protection was developed in accordance with the basic response strategy and tactics agreed in this phase.

A draft procurement plan for primary response equipment to be used for offshore protection for Tier 1 oil spill was proposed by Japanese study team, which includes an equipment list with specifications and budgetary costs. In accordance with the plan, a draft “Material Requisition” for immediate procurement of the response equipment by SOC was also prepared by the same team. SOC will then take necessary procedures for urgent procurement of the equipment to be ready prior to the commissioning of the new crude export facility.

The other equipment lists for shoreline protection and shoreline cleanup shall also be provided based on the shoreline protection and cleanup plan of the OSRP. The study shall finalize the lists of response equipment to be procured for the purpose and the available stockpile of the equipment which has been provided by oil companies in the country for protection of oil spill in river.

(8) Manpower and Training

Through participation to the IMO level 3 management course held by the international OSR agency and the desk-top exercises carried out in the workshops, the both study team recognized strongly the importance and effectiveness of OSR training.

In order to improve and enhance the knowledge and skills of the personnel and teams assigned to the organization, a suitable training program for the proper oil spill response shall be established in the responsible bodies and the related organization as essential preparation for the potential emergencies. The training plan in the subsequent phase is proposed as follow.

IMO certified OSR training course

- Level 3 Senior managers and administrators
- Level 2 Supervisors and On-scene Commanders
- Level 1 First responder/ Chief operators (with equipment deployment exercise)

(9) Tasks in subsequence phase

Tasks to be implemented in subsequent phase for finalization of the Terminal OSRP are listed as follows.

- Subjects to be further discussed
 - Functional organization for each EMT
 - Roles and responsibilities of the personnel in EMT organization
 - Assessment of environmental and social sensitive areas
 - Priority for protective areas against the probable oil spill
 - Applicable protective measures for the respective sensitive areas
 - Oil spill response equipment to be procured
 - Training and exercise plan
- Documentation
 - Finalization of Terminal OSRP (main document)
 - Associated operational manuals/ procedures and plans
- Preparation
 - Procurement of response equipment/ materials
 - Training and exercise
 - Preparation of legal framework: domestic laws/ regulations, international conventions/ agreements
 - Financing: budget, fund/ insurance

End