

## Mitigating the Implication of Offshore Oil and Gas Activities on the Marine Environment in Malaysia: Some Measures through Environmental Impact Assessment

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**Abstract:** Malaysia's maritime sector plays an important role in the country's economic growth and development. Specifically, petroleum and gas constitute the single largest export commodity and contribute significantly to the economy. On the other hand, the downside of petroleum development has left adverse impact on the marine environment. As a developing country as well as a petroleum-producing nation, Malaysia faces a critical challenge in seeking to balance between protection of the environment, and economic development of oil and gas. Dealing with this challenge means finding a strategy that can take into consideration the importance of both needs. One mechanism implemented in Malaysia as a mandatory legislative requirement on oil and gas activities is that of environmental impact assessment (EIA). Principal purposes of this paper are to highlight the processes of EIA under the law, and to identify their significance in mitigating adverse environmental impacts from oil and gas activities. This paper argues a strong case for the application of EIA for countries like Malaysia as a measure to achieve the balance between economic development and environmental protection.

**Key words:** Marine pollution, oil and gas activities, Environmental Impact Assessment, environmental law.

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### INTRODUCTION

As a maritime nation, Malaysia has one of the largest continental shelves and a distance of 200 nautical miles of the exclusive economic zone. The many seas surrounding Malaysia are important to the country as they are rich in various resources including the most economically valuable; oil and gas. The oil and gas industry in Malaysia is generally divided into upstream, midstream and downstream activities. Upstream activities consist of exploration, development and production of oil and gas resources. Midstream and downstream activities range from the transportation of oil and gas, to refining and processing through to marketing and trading of end products. In terms of size, upstream oil and gas production including petroleum and gas contributes RM87 billion, while downstream activities including refining contributes RM24 billion. Overall, these oil and gas resources have fuelled the country's economic growth and contributed approximately 20 percent of the national GDP. By the year 2020, Malaysia aims to have a more diversified oil, gas and energy sector that remains vital to the country's development, and that builds on the nation's competitive advantages.

Nevertheless, from an ecological perspective, there is a persistent concern over the adverse impacts of oil and gas activities on the marine environment that can occur at the various phases of their production projects. For the upstream activities, referring to activities in the oil and gas industries from continental shelf and deep waters, their environmental concerns are varied. They include habitat protection and biodiversity, pollution discharge, incidents of oil spills, and water contamination. However, for these activities, their actual adverse environmental implication may depend upon the stage of the process, the size and complexity of the project, and the nature and sensitivity of the surrounding environment (Maizatun, 2011).

With the growing concern of environmental deterioration due to the fast economic development (Mazlan, 2005), Malaysia has to find and adopt strategies that can strike a balance between the need for development and the conservation of the environment. One of such strategies adopted by Malaysia as a mandatory legislative requirement to mitigate adverse environmental impact from oil and gas activities is in the form of environmental impact assessment (EIA). For Malaysia, the role of the government in setting and enforcing the EIA regulations is considered as key towards minimizing the potential environmental impact. It is also a key in attaining sustainable development through the balance between economic development and sustainable utilization of natural resources. Arguably, such balance can be achieved through EIA by ways of identifying and assessing activities known to have significant impacts on the environment. This paper seeks to highlight the processes of EIA under the law, namely the Environmental Quality Act 1974, and to identify their significance in mitigating adverse environmental impacts from oil and gas activities. This paper argues a strong case for the application of

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EIA for developing countries like Malaysia as a measure to achieve the balance between economic development and environmental protection in the activities necessary for offshore oil and gas projects.

***Environmental Impact Assessment (EIA):***

In general, EIA is applied worldwide as the procedure and management techniques, which ensure that the likely effects of any new development on the environment are fully appraised before the development is allowed to proceed. EIA is also a planning mechanism for preventing environmental problems due to a project activity. It ensures that the potential problems are foreseen and addressed at an early stage in the project planning and design. Thus this will avoid costly mistakes in project implementation, either because of the environmental damages that are likely to arise during project implementation, or because of modifications that may be required subsequently in order to make the action environmentally acceptable.

Historically, EIA was first introduced by the United States in 1969 as a domestic law through the National Environmental Policy Act. Over the years many other countries follow suit by incorporating EIA into their legal regimes, including that of Malaysia. For Malaysia, EIA is made a mandatory self-assessment exercise under the law and is considered as a preventive and precautionary mechanism against potential environmental degradation. EIA when integrated into the existing planning and decision-making structure provides additional information towards a better decision-making. It is envisaged that, by making EIA compulsory under the law, potential damage to the environment can be minimized or prevented at the initial stage of the project itself. It also helps ensure that active and direct participation of stakeholders in the EIA process can be achieved.

***Application of EIA in Malaysia:***

For Malaysia, the idea of applying EIA as an environmental strategy began in the 1980s after a realisation that existing strategies were not sufficient to deal with environmental problems especially those that occur as a consequence of development activities (Maizatun, 2009). During that time, the main policy issue faced by Malaysia was how to balance the conflicting needs of economic development and environmental protection (Department of Environment, 1987). Being a developing country that aimed at becoming a developed nation by the year 2020, economic progress was considered the key in achieving its aim. However, at the same time, economic activities continued to degrade the country's environmental quality and natural resources. Resolving this issue required finding a strategy that could take into consideration the importance of both environmental protection and economic development. In the context of sustainable development, EIA has been considered an essential planning and management tool to achieve an acceptable balance between the environment and development. EIA is therefore significant to environmental protection and management as a whole and must be designed and formulated with this objective in mind. Finally, in 1985, the Environmental Quality Act 1974 (EQA), which was the main environmental legislation in Malaysia, was amended to include a far-reaching provision of EIA under section 34A (Maizatun, 2009). Under this section, the Minister is empowered to prescribe any activity, which may have significant environmental impacts as a prescribed activity for the purpose of EIA regulation.

Section 34A further requires the project proponent of a prescribed activity to submit an EIA report to the Department of Environment for approval. It is a requirement that the EIA report submitted must be in accordance with the guidelines prescribed by the Department of Environment. These guidelines, which are published in forms of handbooks, contain guiding principle and procedure to assist project initiators in the preparation of EIA reports. The importance and legal status of these Guidelines have been decided by Judge James Foong in *Kajing Tubek & Ors. V. Ekran Berhad & Ors.* {1996} 2MLJ 388, when he said "the Guideline become a subsidiary piece of legislature when published by the Director General". The judge further said that the process is therefore mandatory and any decision made by the Director General without the above procedure being adhered to will be against the legal provisions of the EQA and its subsidiary legislature. As such the procedures contained in the EIA Guidelines are legally enforceable and binding on all parties. For any project proponents in preparation to submit the EIA report, they have to refer to at least two different types of handbooks. First is the 'Handbook of EIA Guidelines', which provide for general EIA guidelines and procedure (Department of Environment, 1995). The other is a guideline that deals with specific project, and meant to supplement the EIA Handbook. In relation to oil and gas activities, the specific guideline applicable is the 'Environmental Impact Assessment Guidelines for Petroleum Industries', published by the Department of Environment (Department of Environment, 1996). This publication would be used as a reference by the project proponent, and as well as petroleum companies, operators or contractors on the selection of alternatives, preparation and mitigation.

Under the Environmental Quality Act 1974, the main EIA procedure required for the preparation and submission of two EIA reports by the project proponents, namely the preliminary assessment and the detailed assessment. The former is an assessment of impacts due to those activities that are prescribed and it is initiated normally during the early stage of project planning. The results of preliminary assessment are reported formally for examination and approval to the Director General of the Department of Environment. The second type of

report, the detailed assessment is a procedure undertaken for those projects with major or significant impacts to the environment. The objectives of detailed assessment include: to describe the significant residual environmental impacts predicted from the final project plan; to specify mitigating and abatement measures in the final project plan; and to identify the environmental costs and benefits of the project to the community. Notwithstanding, the Director General of Environment has the prerogative to request a detailed assessment of a project, which has significant impacts to the environment of projects, which are located in or adjacent to environmentally sensitive areas. The detailed assessment also involved EIA report display for the public and affected community to comment. The next procedure is the review of the detailed EIA assessment by an ad hoc review panel. The objectives of review include: to critically review the detailed assessment reports; to evaluate development and environmental costs and benefits of the final project plans; and to formulate recommendations and guidelines to the project approving authority relevant to the implementation of the project.

Until now, 19 activities, including those relating to the oil and gas, have been identified as prescribed activities under the Environmental Quality Act 1974. For all these 19 activities, their EIA requirements and approval are regulated by the Department of Environment, being an agency entrusted with the power to enforce the Act. However, in relation to offshore oil and gas, and in accordance with international law, the jurisdiction of the Department is confined to the limit of territorial waters of Malaysia, which is 12 nautical miles. This legal requirement indicates that the EIA provision cannot be imposed on oil and gas activities beyond the said territorial limits even though other laws, such as the Exclusive Economic Zone Act 1984, are still applicable upon them. Nevertheless, for administrative purposes, for petroleum projects that fall beyond the 12 nautical miles but within the exclusive economic zone, EIA is required upon these projects on the basis of an administrative arrangement within the various federal government agencies including the Department of Environment, Ministry of Domestic Trade and Consumer Affairs; and Marine Department.

Therefore, by virtue of section 34A of the Environmental Quality Act 1974, it is a requirement that all prescribed activities, including that relating to oil and gas, need to obtain EIA approval from the Director General of the Department of Environment before getting the approval for project implementation from the approving authority. For the purpose of EIA in Malaysia, the approving authority is the government authority that has the task of deciding, whether or not a project should proceed. For these offshore projects that are beyond the limits of the Malaysian territorial waters, the approving authority is the Ministry of Domestic Trade and Consumer Affairs. However, for other types of prescribed activities, the authorities are as follows: The National Development Planning Committee for Federal Government sponsored projects; The respective State Planning Authorities for State Government sponsored projects; The Regional Development Authorities for the State Executive Committee; and Ministry of International Trade and Industry, with due reference to the Malaysia Industrial Development Authority (MIDA) for industrial projects.

#### ***EIA for Oil and Gas Industries:***

As already mentioned, the oil and gas industry in Malaysia is categorized into two types of activities, upstream and downstream. The former is composed of exploration and production, while the latter deals with refining and processing of crude oil and gas products, their distribution and marketing. Specifically, for the purpose of EIA in Malaysia, 'offshore' is defined by the Guideline as 'the waters from the lowest low tide level to the 200 nautical mile exclusive economic zone limit'. For oil and gas fields development, offshore platforms are typically steel jacket structures located in 10 to 80 meters of water in the South China Sea. On these steel structures is process modules that separate oil, gas and water produced from the subsurface reservoirs. There are possible environmental impacts from the activities arising from the exploration phase until the project is decommissioning. Each stage can bring about potential negative effects on the environment, whether on the marine ecosystem, coastal areas and on the land.

Several activities relating to oil and gas have been identified by the Environmental Quality Act 1974 as prescribed activities, which require the application of EIA. These activities, which are listed under the Environmental Quality (Prescribed Activities)(Environmental Impact Assessment) Order 1987, are:

- oil and gas fields development; construction of off-shore and on-shore pipelines in excess of 50 kilometres in length;
- construction of oil and gas separation, processing, handling and storage facilities;
- construction of oil refineries; and
- construction of product depots for the storage of petrol, gas or diesel (excluding service stations) which are located within 3 kilometres of any commercial, industrial or residential areas and which have a combined storage capacity of 60,000 barrels or more.

It is a requirement under the Environmental Quality Act 1974 that the EIA for oil and gas activities should be carried out early in the project cycle in order to assist in project planning where environmental considerations are incorporated at the earliest level of project planning. Malaysia follows the internationally accepted key processes of EIA including screening, scoping, assessing, and implementing project proponent's engagement. The generalized pathway for planning approval of the petroleum industry project is provided in Table 1 below.

**Table 1:**

| STAGE                            | ACTION  | BY WHOM  |
|----------------------------------|---|--|
| 1. Project Identification        | - Reconnaissance survey<br>- Screening  | - Project proponent<br>- Project proponent and EIA consultant  |
| 2. Pre-feasibility               | - Identification of sites<br>- Site selection<br>- Scoping  | - Project proponent<br>- Project proponent and EIA consultant<br>- Project proponent and EIA consultant  |
| 3. Feasibility                   | - Conceptual Plan<br><br>- Selection of option decision on project Preliminary EIA<br><br>- Submission of Preliminary EIA to DOE for approval<br>- Application to local authority for permits<br>- DOE and local authority send preliminary EIA and project submissions for permits to various public sector agencies for comments<br>- Comment complied and Recommendation made<br>- Decision on Preliminary EIA<br>- Project proponent informed of Preliminary EIA and occupational safety approval | - Architect/planner appointed by project proponent<br>- Project proponent/ EIA consultant<br><br>- Project proponent/ EIA consultant<br>- Project proponent<br><br>- DOE for preliminary EIA, Local Authority for project submissions<br><br>- DOE and local authority<br><br>- DOE<br>- DOE |
| 4. Detailed Design               | - Detailed layout and engineering design<br>- Submission to Ministry of Trade and Consumer Affairs<br>- Incorporation of detailed layout by referred agencies   | - Project proponent<br><br>- Project proponent<br><br>- Project proponent  |
| 5. Implementation and Monitoring | - Construction<br>- Operation   | - Project proponent and DOE<br>- Project proponent and DOE   |

Source: Department of Environment Malaysia

Under the Environmental Quality Act 1974, the EIA procedure for each and every prescribed activity is designed to follow the integrated project planning concept, where environmental considerations are incorporated at the earliest level of project planning, carried through development to project implementation, and continues throughout the operation of the project. Thus, for each of these prescribed activities, the project proponent must go through various processes, which are part of the EIA requirements as preventive measures against potential environmental issues associated with the oil and gas activities. The overall EIA process for petroleum industry is provided in Table 2 below:

**Table 2:**

|                        |                         |  |                                    |  |
|------------------------|-------------------------|--|------------------------------------|--|
| 1. Site Selection<br>⇒ | 2. Project Scoping<br>⇒ | 3. Preparation of EIA:<br>- Site selection<br>- Regional Planning<br>- socio-economic<br>- existing environment<br>- public participation<br>- risk management<br>- modelling<br>- environmental management & response procedures<br>⇒ | 4. Review and approval of EIA<br>⇒ | 5. Compliance:<br>- auditing<br>- monitoring |
|------------------------|-------------------------|--|------------------------------------|--|

Source: Department of Environment Malaysia

**EIA: Mitigation of Adverse Environmental Impact for Oil and Gas Industries:**

The protection and promotion of human rights has since becomes a global concern. One of the remarkable events in international law since the end of the Second World War has been the vast growing of global concerns to protect human rights (Trinidad, 2008). This is evident in the preamble to the Universal Declaration of Human Rights (1948), which states that: “recognition of the inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, peace and justice.” This declaration has led to the emergence of regional concerns for the protection of human rights and the subsequent adoption of regional human rights instruments. Table 2 above, which shows the overall EIA process for oil and gas industry projects, involves a number of successive steps. They include, site selection to determine the suitability of the site; project scoping to determine the pertinent environmental issues; conduct of the preliminary EIA and

submission to the Department of Environment; EIA review and approval of the Department of Environment; activities during project implementation for compliance with the EIA; and EIA approval conditions. Within the whole of EIA processes as shown in Table 1 and Table 2 above, three most important processes that enable the identification of possible adverse environmental impacts of the proposed activity, and their mitigating measures are screening, site selection, and project scoping, undertaken either during the project identification or pre-feasibility stage. Possible opportunities for mitigating and preventing of environmental impacts derived from these processes are discussed further below.

#### **A. Screening:**

At the initial stage of project identification, well before planning studies are initiated, it is possible to determine whether a project should undergo a preliminary assessment. Screening is thus the process by which a decision is taken on whether or not an EIA is required for a particular project. At this stage, the only information required is the nature of the project and its general location. A project should be screened by checking with the law whether it should undergo preliminary assessment. Generally, the screening procedures can be broadly classified into two approaches: a standardized approach, in which projects are subject to or exempt from EIA defined by the law; and a customized approach, in which projects are screened on a case-by-case base. Main objectives of screening are to ensure that a full EIA is only performed for projects with potentially significant adverse impacts or where impacts are not sufficiently known. Screening thus involves making a preliminary determination of the expected impact of a proposed project on the environment and of its relative significance. A certain level of basic information about the proposal and its location is required for this purpose.

In Malaysia, the implementation of EIA procedures under the Environmental Quality Act 1974 helps facilitate the screening process by defining for which project categories an EIA is required, including projects with major significant impacts that require the submission of detailed EIA report. For these type of projects which are likely to have significant adverse environmental impacts that are serious, diverse, or unprecedented, the submission of Detailed EIA Reports is required. In Malaysia, screening is considered as a flexible process, which can be extended into a preliminary form of an EIA study. If a preliminary assessment is undertaken to assist in the screening decision, the information from the preliminary assessment can also be used for scoping and later in the actual EIA process.

For the project proponent, when preparing the EIA report, they must ensure that each classified activity described is organised into various areas such as baseline information; key issues; prediction and evaluation of impacts; mitigation and abatement measures; and environmental management planning. Thus, for activities involving offshore oil and gas fields development, it is necessary for the project proponent to gather reliable baseline information for the overall project to be included within the preliminary EIA. Two types of database information are required here; one of which is project information pertaining to the fabrication, construction, installation, drilling and operational phases. Another is environmental information pertaining to existing environment in the project area covering physical, chemical and biological characteristics.

#### **B. Selection of the Project Site:**

One of the foremost steps within the processes pertinent in environmental protection is that of site selection. This process is also the most important prerequisite in considering environmental impacts. Environmental impacts resulting from the oil and gas activities are largely dictated by the location of the facility and its associated infrastructure. Therefore, proper site selection during the planning process is essential for minimizing these impacts. Specifically, in order to prepare the EIA, the project proponent must conduct a field survey of marine biodiversity including fisheries population and habitat quality for each land form unit. For this purpose, the project proponent must introduce within the project description or site selection issues related to the potential and residual impacts. For example, the key issues of concern in an offshore field development would include gaseous emissions; produced water and drilling discharges; accidental spills and leaks; waste management; and hazardous material handling. These identified issues would be assessed and classified to generate a list of potential impacts for each zone of development before the said impacts can be predicted and evaluated. Specifically, their prediction is founded by commonly used methodologies and models, whereas their evaluation is where the predicted impacts are judged on their significance. The judgment of such significant would depend on environmental factor being evaluated, and can be based on several criteria including laws, regulations, or acceptable national or international standards. For Malaysia, under the Environmental Quality Act 1974, in the case of offshore activities, evaluation of impacts on marine quality and ecosystem would be in accordance with acceptable international standards such as that of the United States Environmental Protection Agency, or the listing of unique and endangered species of the Convention of International Trade in Endangered Species of Wildlife Fauna and Flora (CITES).

In the case of oil and gas activity, its site selection typically takes place in the early stages of a project and leads to the identification of a preferred site and possibly one or two alternatives. An EIA, usually accompanied by a site-specific monitoring programme, will then be carried out for the identified location locations. For

administration and regulation purposes, approvals from the approving authorities can only be issued after the screening of site selection is completed and documented. Whereas on the part of the Department of Environment, they may approve the EIA report but attach conditions to report approval, such as to implement mitigation measures or to make changes in project configuration, in order to minimize impacts on the project site. In some cases, however, the EIA may also come to the final conclusion that the chosen sites are not suitable, even if impact mitigation measures are implemented.

In Malaysia, site selection takes place during a preliminary EIA study as part of the screening process. To facilitate site selection for oil and gas projects, planning authorities may designate suitable areas in regional development plans or may provide criteria that can be used by project proponent for site-selection. Selection of sites must be carried out on a case-by-case basis, since there are a large number of site-specific considerations that vary according to the specific operational aspects of each plant. The criteria for selecting a new site normally include engineering, environmental and economic aspects. Usually, some of these criteria limit the choice of potential sites to a given few. These sites are then investigated further for their suitability through site visits and analysis of existing information. During this stage, measures to protect the environment and resolve socio economic issues are also considered. Where the project is situated on public land or near waterways, and alternative users will be affected by the project, the issue of compensation and offset investment should be addressed in the EIA.

Under the EIA procedure, project proponent is encouraged not to select site which is located in or adjacent to Environmentally Sensitive Areas (ESA), as defined in National Physical Plan 2005. ESA shall be integrated in the planning and management of land use and natural resources to ensure sustainable development. The management of ESA shall be guided by the following criteria:

- ESA Rank 1 – No development, agriculture or logging shall be permitted except for low-impact nature tourism, research and education.
- ESA Rank 2 – No development or agriculture. Sustainable logging and low-impact nature tourism may be permitted subject to local constraints.
- ESA Rank 3 – Controlled development where the type and intensity of the development shall be strictly controlled depending on the nature of the constraints.

For oil and gas projects, their site should also be selected based on economic and technical feasibility and risk considerations. The project proponent should incorporate screening of preliminary sites for environmental sensitivity and importance before acquiring of land. The EIA for projects located near to environmentally sensitive areas must be more comprehensive in reflecting other environmental issues of importance. Thus any proposed site located close to a marine resource should also be assessed for habitat and ecological importance.

### **C. Scoping:**

Scoping is the process of determining the content and extent of the EIA studies. It is a crucial step in EIA because it identifies the issues of importance and eliminates those of little concern. In this way, it ensures that EIAs are focused on the significant effects and do not involve unnecessary investigations that waste time and resources. In addition to the EIA guidelines, project proponents who are required to carry out detailed assessment also receive terms of reference (TOR) from the review panel for the detailed assessment. The TOR which are elaborated in the scoping process, provide clear instructions to the project proponent on the information that needs to be submitted to the competent authority for EIA, and the studies to be undertaken to compile that information. In Malaysia, the TOR are issued in a detailed assessment and listed the significant environmental impacts and the impacts of unknown significance that must be assessed during the detailed assessment. They also detailed out the purpose of the assessment and itemized potential environmental impacts predicted during the preliminary assessment that require further assessment. Within the EIA procedure, scoping process must be undertaken very early in the planning of the project to be effective. The results of scoping must be incorporated in the final design and be translated into the overall project implementation, and must be documented in the EIA report. Among the rationale of scoping is that it enables the limited resources of the team preparing the EIA to be allocated to the best effect, and prevents misunderstanding between the parties concerned about information required in an EIA report (Department of Environment, 1997). Scoping which sets the boundaries of the EIA, and defines the significant issues, which need to be addressed, is an important step in the EIA as it also allows for mitigating the impacts of oil and gas activities on the marine environment. Specifically, scoping defines at the earliest level the linkages between site selection, baseline data and project description with the impact assessment components of potential impacts, residual impacts and mitigation.

There are a number of important elements in scoping, including site selection; geographic scope; risk assessment; project phases; and public involvement. Since scoping is a multi-disciplinary task, public participation is therefore a necessity. Public participation here refers to getting input from the various stakeholders such as architects, engineers, designers, planners, environmental consultants, risk consultants and affected local community. In Malaysia, public participation is a mandatory requirement in the planning and implementation of development projects, and an inherent component of the EIA process, especially of scoping.

As a general rule, the public should be involved as early as possible and continuously throughout the EIA process. Among the overall objectives of public's involvement in the EIA process include:

- To inform the public about the project and its value, and about project alternatives;
- To gather a wide range of perceptions of the proposed project and take advantage of the knowledge of indigenous and local communities about their living environment, thereby ensuring that important issues are not overlooked when the Terms of Reference of the EIA are prepared;
- To address and dispel if necessary subjective doubts and concerns about the project;
- To develop trust and working relationships among the stakeholders, including the affected communities, particularly vulnerable groups, developers, planners, local and national governments, decision-makers, or non-government organizations.

For the project proponent in an oil and gas project, among possible public participation issues that must be considered include site specific sensitivities: such as sites with certain religious and cultural significance; historical context such as incidences of negative environment or public health impacts of current or early projects; political considerations, such as concerns with the influence of certain industries, or interest groups, and the equity aspects of benefits and drawbacks of the proposed project; public education, such as information of the public about benefits and possible drawbacks of the project; and conflict resolution, such as in certain cases public participation may involve the resolution of conflicts and the reaching of a consensus among interest groups concerning the proposed project.

EIA in Malaysia acknowledges the importance of public involvement within its process and provides two options for such involvement, namely public information and public participation. The former is generally a one-way communication from the project initiator to the public, whereas the latter is a two-way communication from the project initiator to the public with feedback from the public. Participation process within EIA in Malaysia is done in two stages: first, during the preparation of EIA study through methods such as surveys and meetings and, second, by written comment procedures after the EIA report was made available for viewing. Under section 34A, public participation process is made compulsory in the detailed assessment. For this purpose, notifications inviting the public to review and give comment on the detailed EIA report are issued by the Department of Environment and can be viewed from its website. These notifications contain the full name and address of the project proponent and the list of venues where the report can be referred to. The public may review the report on dates specified in the notification, and forward their written comments to the Department of Environment.

#### ***E. Mitigation Measures and Final Project Plan:***

Under the EIA process, mitigation of impacts is the stage to determine possible preventive, remedial and compensatory measures for each of the adverse impacts evaluated as significant. Mitigation measures which may be considered include the following:

- changing project sites, capacity, layout, pipeline routes, disposal routes, timing or project schedule, engineering designs, buffer provisions, and others;
- introducing pollution controls, waste minimization, waste management, phase implementation, awareness programmes, safety, health and environmental programmes,
- compensation to restore, pay, relocate or provision of concessions of damages; and
- establishing or participating in an oil spill response network to respond effectively to accidental discharges or spills from non routine operations.

As part of the EIA procedure and legal requirement, the execution of EIA recommendations, and the Department of Environment's approval conditions, would be included within the project proponent's execution plan. Thus, when EIA reports have been approved by the Department of Environment, the project proponents and the other relevant authorities must take action to ensure that the recommended mitigation measures are incorporated into the final project plan and are implemented. There are several methods that can be applied by the project proponent to implement the recommended mitigation measures including that of Environmental Management Plan (EMP). The EMP is formulated so as to provide an overall environmental management of the proposed project that will ensure all environmental requirements are met. It thus builds continuity into the EIA process and helps to optimize environmental benefits at each stage of project development. It is also meant to facilitate compliance with environmental protection or mitigation measures so specified. Other objectives include to identify the actual environmental, socioeconomic and public health impacts of the project and check if the observed impacts are within the levels predicted in the EIA; to determine that mitigation measures or other conditions attached to project approval are properly implemented and work effectively; to adapt the measures and conditions attached to project approval in the light of new information or take action to manage unanticipated impacts if necessary; to ensure that the expected benefits of the project are being achieved and maximized; and to gain information for improving similar projects and EIA practice in the future.

***Criminal Sanction:***

To ensure transparency and in its effort to improve the public delivery system, the Department of Environment displays in its website all EIA reports under review; both preliminary and detailed assessments, as well as all reports that are approved and not approved. Under section 34A, criminal sanctions are imposed on those who failed to submit the EIA report to the Department of Environment or those who failed to abide by the conditions attached thereto. Penalties for contravention of the provisions include a fine of up to Ringgit Malaysia one hundred thousand (RM 100000) or imprisonment for a term not exceeding two years or to both, and to a further fine of Ringgit Malaysia one thousand (RM 1000) for every day that the offence is continued after a notice of compliance has been served. According to the Department of Environment, in 2009, a total of 277 EIA reports were received and a total of 1289 enforcement investigations were conducted to check on the progress of projects and compliance of EIA approval conditions (Department of Environment, 2009). Consequently, the Department served 867 notices or return directives, and 53 compounds to those who contravened the compliance requirement. In the same year, the Department brought 28 cases to court for non-compliance of section 34A with the total fine imposed of approximately Ringgit Malaysia two hundred and fifty thousand (RM 250000).

***Conclusion:***

This article has examined the application of EIA as a legal measure to mitigate the impact of oil and gas activities on the marine environment. It is a procedural requirement of EIA in Malaysia to include mitigating measures which are considered vital components to determine possible preventive, remedial or compensatory actions for each of the adverse impacts evaluated as significant. For offshore oil and gas field development activities, their mitigation measures would be considered, among other things, in relation to marine environmental protection, and include the introduction of the followings: pollution controls; waste minimization; waste management; phase implementation; awareness programmes; and safety, health and environmental programmes. The law in Malaysia requires the EIA to be carried out early in the project cycle. The reason for this is because EIA can be used to assist in project planning where environmental considerations are incorporated at the earliest level of project planning. It is then carried out through development and project implementation, and continues throughout the operation of the project.

Since EIA is made mandatory under the law, the relevant authority has a legal mandate to impose it on any identified projects throughout the country. For a developing country like Malaysia, which is well-endowed with rich marine resources, EIA is significant as it helps balance the conflicting needs for development in the oil and gas sector and marine biodiversity conservation. The EIA reviewed demonstrates that this regulation provides a framework for information analysis and decision making, which, when supported by various processes that take into consideration economic and environmental factors, helps mitigate possible adverse environmental impact and delivers sustainable results. The experience has shown that the outcome of the implementation of the EIA amongst the oil and gas industry has been positive. EIA enforcement, which is self-regulatory places increasing responsibility on the industry to provide assurance that the law is met. It also requires them to place more emphasis on establishing effective environmental management systems within their establishment. Oil and gas industry in Malaysia is expected to grow to meet her demanding economic needs. Thus, it is important for Malaysia to ensure that EIA continues to be relevant not only for the purpose of mitigation, but also in the country's overall environmental agenda and sustainability target.

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