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Global Dispersant Approvals in Asia Pacific – Current Status and On Going Challenges

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ABSTRACT

Following the Macondo Incident, the international oil and gas industry spent significant time and effort analyzing lessons learned and implementing key projects to ensure that critical response and preparedness issues that were identified are addressed to improve response capabilities. The Global Dispersant Stockpile (GDS) was established as part of a post-Macondo Joint Industry Project through Oil Spill Response Limited (OSRL), recognizing that delivery of sufficient quantities of dispersant is a key element for a successful dispersant operation, especially during the initial phases of a large scale response to an event such as a subsea well blowout. Taking into account the global approval status and proven effectiveness on a range of crude oils, three key oil dispersants, Finasol® OSR 52 (Total), Corexit® EC9500A (Nalco) and Slickgone® NS (Dasic) were selected for the Global Dispersant Stockpile. A total of 5,000 m^3 of these dispersants are now stored and ready to be deployed from five strategically positioned global locations. For example, sizable volumes of two of these products (total volume = 700 m^3)

are located at OSRL's response base in Singapore, which can be quickly mobilized to support a response in the Asia Pacific region.

An ongoing effort associated with the management of the GDS is to enable the pre-approval of at least one of the three products for countries in the region where spill response may be required. At present, this is not the case in the region for a variety of reasons, e.g., toxicity concerns and biodegradation processes of dispersed oil. A particularly cautious approach by regulatory authorities following the Macondo incident, coupled with a number of other specific regional concerns, has exacerbated the issue of obtaining and maintaining dispersant approvals in the region.

The aim of this paper is to identify and discuss the existing regulatory framework governing the dispersant product approval process and dispersant use authorization for countries in Asia Pacific. The paper will detail the present status of regulations related to dispersant use for a number of countries in the region, the potential challenges associated with achieving permissions in countries with no regulations and a discussion of strategies to address identified obstacles. Additionally the activities that are being undertaken to expand regulatory approvals will also be addressed. It is anticipated that a greater understanding of the reasoning behind the GDS will facilitate a positive regulatory perspective and the potential for dispersant pre-approval in the region.

INTRODUCTION

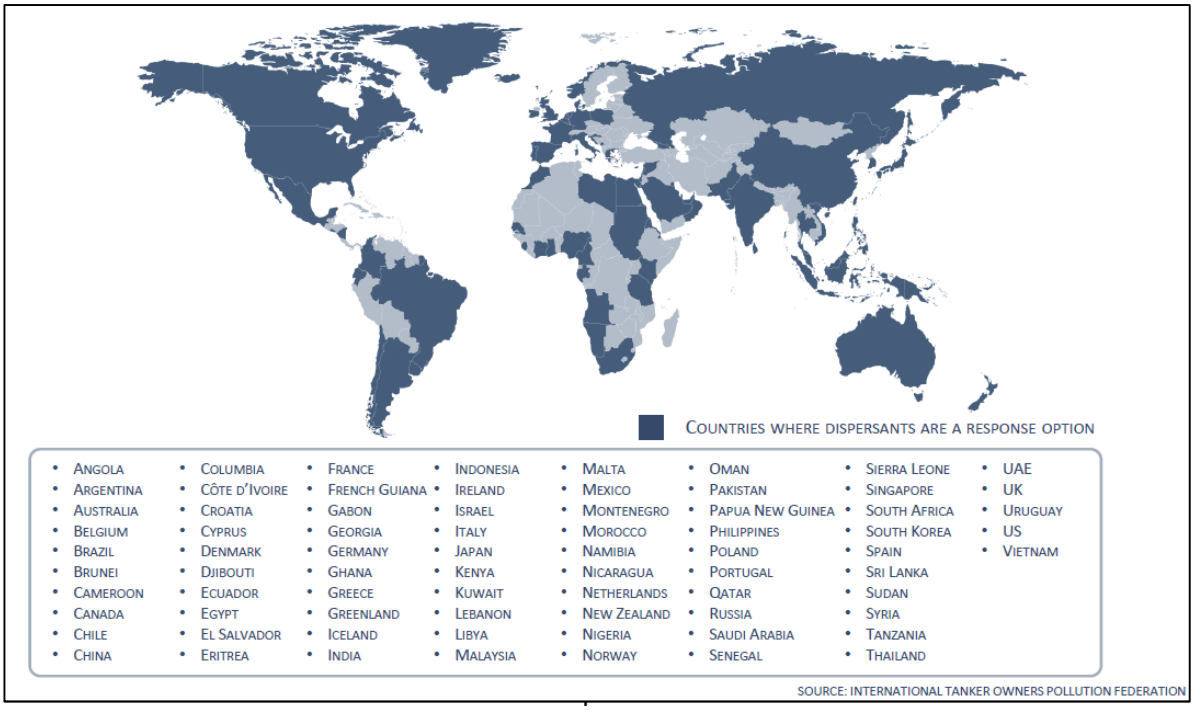
Dispersant use can be a critical component of an effective response to larger offshore oil spills. In particular, when used appropriately, dispersants offer the potential to greatly reduce the possibility of long term environmental damage that may be caused by floating oil slicks by

removing them from the sea surface or, in the case of subsea use, by preventing a large percentage of the oil from even reaching the sea surface. In either case, the end result is to minimize and potentially prevent oil from stranding on sensitive shorelines. From a net environmental benefit perspective, this does appear to have been realized following large incidents such as the Sea Empress spill (UK, 1996) and well blowouts in Australia (Montara, 2009) and in the Gulf of Mexico (Macondo, 2010) in that dispersants were used to reduce the amount of surface oil that could have impacted sensitive shoreline ecosystems.

In the event of an oil spill, regulators should work to ensure that all available spill response tools are considered when developing and implementing the most effective response possible. They also need to have the appropriate information in order to be able to describe and justify their decisions to a wide range of stakeholder communities. The successful use of dispersants in an incident is often time dependent and therefore, pre-established and well understood regulations concerning dispersant approval and use are critical to support the timely decision-making process. In consideration of providing a resource for this, the IOGP-IPIECA (International Association of Oil and Gas Producers; IPIECA is the global oil and gas industry association for environmental and social issues) guidance document, *Regulatory Approval of Dispersant Products and Authorization for their Use,* was developed to provide relevant background information for use by regulators to ensure that a fit-for-purpose dispersant policy is established as a part of a national oil spill planning framework. (IPIECA-IOGP, 2014) The main purpose of the document was to establish a common understanding of what is important for an effective regulatory approval process for dispersants and their use and it identified several key factors to be considered during the evaluation process of candidate dispersants. These include the concepts that:

1. Dispersants under consideration should possess a minimum level of performance since it is the goal to use products that increase dispersion over that which would happen naturally.
2. Dispersants by themselves should be minimally toxic to marine organisms. In particular, "care needs to be taken when considering the issue of dispersant toxicity versus the toxicity of dispersed oil (dispersant plus oil)." (IPIECA-IOGP, 2014) During the dispersant approval process, these levels of toxicity could be considered to be:
   A. "a level where the oil and dispersant mixture is no more toxic than the oil alone at the same exposure levels, or
   B. if the dispersant is tested alone, then it should be significantly less toxic than a reference oil." (IPIECA-IOGP 2014)

Dispersants as a response option is approved for use in a number of countries globally and Figure 1, prepared by the International Tanker Owners Federation (ITOPF), gives an indication of



where their use is a primary or secondary option for a response. (ITOPF, 2016)

Figure 1 Countries where Dispersants are a Response Option (Source: ITOPF)

In terms of product approval, effectiveness and toxicity testing are generally the two tests stipulated by many countries around the world. While the exact test procedures may vary from country to country, there are several dispersants that have been approved widely. In particular, the products, Finasol® OSR 52, Corexit® EC9500A and Slickgone® NS, are the most widely approved and are frequently considered to be "international dispersants."

DISPERSANTS AS A RESPONSE OPTION IN ASIA PACIFIC

The Asia Pacific region has made notable progress over the past few decades in terms of promoting oil spill preparedness and response. Most of the countries in the region have been successful in developing a National Oil Spill Contingency Plan (NOSCP), designating a competent national authority for implementing the plan and ratifying relevant international conventions.

The use of dispersants as an effective response option has been supported in the region for more than twenty years. While some success has been observed in terms of having regulatory stakeholders accept dispersants as response tool, there is more to be done with respect to their successful operational implementation during a major offshore incident. Moreover, widespread media misinformation and reporting during and after the Macondo spill has resulted in many governments taking a more cautious approach towards approving dispersants. This lack of accurate information, combined with what appeared to be unrealistic expectations about the effectiveness of other spill response options such as mechanical recovery and a lack of awareness

of the concept of Net Environmental Benefit Analysis / Spill Impact Mitigation Assessment (NEBA/SIMA), can prove to be major obstacles even for the appropriate use of dispersants.[1]

COUNTRY DISPERSANT POLICY

The following section provides details on the present status of regulations related to dispersant use for a number of countries in the Asia Pacific region, the potential challenges associated with achieving permissions in countries with no regulations and a discussion of strategies to address identified obstacles. The current activities that are being undertaken to expand regulatory approvals are also discussed in order to identify strategies for modifying the regulatory stance on dispersant use in the region for major offshore oil spill incidents. As shown in Table 2, there can be significant differences from country to country.

Table 2: Additional Details Relating to Asia Pacific Dispersant Approvals

Country	Dispersant allowed	Dispersant regulatory framework [2]	Dispersant use as first option	Restrictions for use
Bangladesh	Yes	Yes	No	Information not available
Brunei	Yes	Yes	Yes	• Reef within 1 nm of the shoreline • Mangrove areas and mudflats with water depth less than 2.5m • Shallow water, <10m • Estuaries where fish spawn and feed • Close to aquaculture facilities
Cambodia	Yes	Yes	No	• Depth <10m • 2 nm away from shoreline • Outside of Dispersant Usage Zones
China	Yes	Yes	No	• Light product, e.g. kerosene, gasoline • High wax/ high pour point/high viscosity oil • Shallow water area or quiet water area • Fresh water source, area of important influence to marine products resources
India	Yes	Yes	No	• Sensitive areas, shallow waters, protected bays and inlets • Type 1 dispersant shall not be used • Spillage of light distillate fuels

[1] Spill Impact Mitigation Assessment (SIMA) builds on the concept of NEBA by expanding the analysis response by recognizing that response option trade-offs apply to a wide variety of environmental considerations and stakeholder concerns. For the present time, both names will be used with the expectation that SIMA will come to replace NEBA.

[2] Have policy governing the dispersant approval process and dispersant use authorization.

				• Weathered viscous emulsions
Indonesia	Yes	Yes	No	• Rivers, water intakes, near ports • Water depth < 20m • Low flushing area • Sensitive areas – coral reef, mangrove
Japan	Yes	Yes	No	Information not available
South Korea	Yes	Yes	No	Information not available
Malaysia	Yes	Yes	No	• Marine aquaculture areas • Fresh water environments • Areas gazetted as Marine Parks, Reserves and Fisheries Prohibited Area under Fisheries Act, 1985 • Dispersant prohibited areas as identified in the Environmental Sensitive Index (ESI) published by PETRONAS. Approval from Malaysia DOE is needed for the areas not within the ESI map
Maldives	TBD	No	TBD	Information not available
Myanmar	Yes	No	No	No policy in place as of yet
Pakistan	Yes	TBD	Yes	Information not available
Singapore	Yes	Yes	Yes	Information not available
Sri Lanka	Yes	Yes	Yes	Information not available
Thailand	Yes	Yes	No	• Shallow water < 10m • Sensitive areas like coral reefs, sea grass, mangrove, near marine mammals • Fresh water and brackish water
Vietnam	Yes	Yes	No	• Areas with a depth under 20m • Within a distance of 1nm from shore • Sensitive areas • Biologically sensitive, low energy environments such as salt marshes, mud flats, mangroves or near coral

For the purpose of this discussion, information on existing dispersant policies for the countries in Asia Pacific is divided into 3 categories (see Table 3), taking into consideration the national dispersant policy and selection of primary response strategy in the country.

Table 3: Asia Pacific National Dispersant Policy Status Categories

Category	Description	Countries
Category I	Dispersant policy available and dispersant is the primary response option.	Singapore, Brunei
Category II	Dispersant policy available. However, other response strategy is preferred over dispersant use.	Malaysia, Thailand, Cambodia, China, India, Indonesia, Japan, South Korea, Bangladesh, Sri Lanka, Pakistan
Category III	Dispersant policy not implemented as yet	Myanmar, Maldives, Vietnam

Category I - Countries with existing regulatory framework with dispersant as first response option

1. Singapore –The Prevention of Pollution of the Sea (Oil Pollution Preparedness, Response and Co-operation) Regulations set out that only those dispersants that have been shown to comply with defined specifications can be approved by the Maritime & Port Authority of Singapore (MPA) for use in Singapore waters. The specifications include, but are not limited to, dispersant efficiency, toxicity and biodegradability testing. Such tests are to be conducted in a MPA appointed laboratory. The response policy in Singapore defines dispersant application as the primary response where practical and where the advantages in terms of environmental protection outweigh the disadvantages of cost and ecological damage, i.e., by using a NEBA/SIMA process. Dispersants have been used as one of the response tools during a number of major oil spills.
2. Brunei – Dispersant use is recognized by the Brunei Darussalam Government as a useful oil spill response option. Dispersants are not prevented from use provided they are on the approved list and are applied under the correct conditions. The Department of Environment, Parks, and Recreation (JASTRE) is responsible for approving dispersants for use in Brunei Darussalam. Dispersant application area maps are available which show pre-approved areas.

Category II- Countries with existing dispersant policy with dispersant not listed as first response option

1. Malaysia - The policy on the use of dispersant is based on Section 14(1) Exclusive Economic Zone Act, 1984 and Section 47 of Environmental Quality Act, 1974. The Department of Environment (DOE) is responsible for dispersant approval. The use of DOE approved dispersants is in accordance with National Oil Spill Contingency Plan and non-DOE

approved dispersants are prohibited from being used in any oil spill response. Dispersant testing for approval is to be conducted at Fisheries Research Institute or other accredited laboratories. Dispersant products that pass the toxicity and effectiveness test will be considered by DOE for approval and included in the DOE list of dispersants. In the event of an oil spill, the application of the DOE approved dispersants in the Exclusive Economic Zone does not require authorization from DOE, provided that all conditions of the guidelines are met. However, for Malaysia Territorial Waters, approval from the DOE State Director must be obtained for use of dispersants listed in the approved dispersant list. (Malaysia, 2016)

2. Thailand –The favoured response technique in Thailand is mechanical recovery, although dispersant use is considered to be a viable option. However, this option should be used only if containment is ineffective or untimely or when a fast response of dispersant will provide more overall benefit to the environment. Dispersant use shall follow the conditions formulated by the Marine Department and the Pollution Control Department (PCD). There is no specific testing method being set in Thailand for approval of dispersant. As such, the PCD established a list of approved dispersant with reference to trusted agencies in other countries such those in the UK, US and Australia.
3. Cambodia - Cambodia does not establish its own dispersant effectiveness and toxicity testing procedures. As Thailand and Cambodia share the same waters within the Gulf of Thailand, dispersants that are deemed safe for usage in Thailand will be adopted for Cambodia. Referring to the National Policy and Guidelines on the Use of Dispersants in Cambodia, dispersant usage zones have been established for Cambodia by taking into consideration environmental and economic resources. The dispersant use zones are generally those that contain resources where there is not a high sensitivity to dispersed oil and have water depths

of >10m and dispersant application is pre-approved. As for zones that are not pre-approved for dispersant application, permission will be required from the Incident Commander.

4. China – Oil spill dispersant use in China is governed by the Oil Spill Dispersant Policy (GB18188) and the two parts under this policy – Technical Regulations (GB18188.1-2000) and Application Criteria (GB18188.2-2000). The Technical Regulations set out the dispersant approval process, including the specific testing methods for the dispersant whilst the Application Criteria set out the basic guidelines for the application of dispersant in Chinese waters. The dispersant will have to be tested by an accredited laboratory in China as identified by Ministry of Environmental Protection (MEP). The authorization for use of dispersant in China is dependent on the area and the prevailing conditions. Only products approved by the China Maritime Safety Administration (MSA) may be used.
5. India – Mechanical containment and recovery is the preferred mean to combat oil spills in India. There are comprehensive policies and regulations being published to govern the dispersant approval and use authorization. The Policy and Guidelines for Use of Oil Spill Dispersants (OSD) in Indian Waters has been in place to guide the dispersant usage, promulgate dispersant specifications and define criteria for their potential approval by Indian Coast Guard. In order for a dispersant to be approved, it has to be tested for toxicity, stability and efficiency by National Institute of Oceanography (or any other laboratory authorized by the appropriate authority). Coast Guard approval must be obtained on each occasion prior to using any oil treatment product in Indian waters unless that use is covered by the terms of a standing approval. Only in the situation of force majeure, where there is risk to human life or the safety of an installation or vessel or where there is a serious danger from fire or

explosion, may oil spill treatment products approved by ICG be used without prior consultation. (Indian CG, 2009)

6. Indonesia – Mechanical recovery is the preferred response strategies in Indonesia due to the abundance of coral reefs and the shallow depth of the coastal waters. The National Oil Spill Contingency Plan states that only dispersants approved by Ministry of Energy & Mineral Resources (DITJEN Migas) can be used in Indonesia waters.
7. Japan – The policy in Japan focuses on physical containment and recovery. The technical standard of dispersant is regulated under Article 43-4 of the Law Relating to the Prevention of Marine Pollution and Maritime Disaster, Article 33-2(2) of Regulations for the Enforcement of the Law Relating to the Prevention of Marine Pollution and Maritime Disaster and the Ministerial Ordinance regulating Technical Standards for Chemicals which are used for the prevention of marine pollution due to oil or hazardous liquid substances. The government treats dispersants as a legally designated chemical agent and has set strict certification standards for their approval. As such, dispersant can be used but requires approval of Japan Coast Guard (JCG) and permission from the local fishing industry. It has generally been agreed with the local fishing industry that dispersant spraying can be used as the main tactic by setting rules for spraying operations and the establishment of zones where dispersants may or may not be used.
8. South Korea – The primary response in South Korea is containment and recovery. There are laws and regulations which govern the use of oil spill prevention materials and agents, including dispersants. In order to obtain approval for dispersant listing, the dispersant is sent for performance testing by the agency appointed by Commissioner of Korea Coast Guard or minister of Ministry of Maritime Affairs and Fisheries. According to the guidelines on the

use of dispersant issued by the Ministry of Environment, dispersant should be used as a last resort.

9. Bangladesh - The Ministry of Environment and Forests (MoEF) will be the nodal ministry for coordinating the emergency response in case of an oil or chemical spill disaster while Department of Environment (DoE) will provide necessary technical and secretarial support to MoEF for effective coordination in case of the incidence of the emergency. (NOSCOP, 2016) According to the National Oil Spill and Chemical Contingency Plan (NOS-COP), the methods employed to tackle the impact from the oil spill must be approved by DoE. The contingency plan also states that mechanical recovery of oil would be the preferred method of response. Dispersant may be used only when mechanical recovery is not effective or possible, after careful consideration based on NEBA / SIMA. The dispersant type must be approved by DoE, Environment Officer, Environment Advisor and on-scene commander in accordance with the national contingency plan as well as the regional plan.[3]
10. Sri Lanka – According to the National Oil Spill Contingency Plan (NOSCP), mechanical clean-up methods have the first priority. However, dispersants can also be used if a NEBA / SIMA discussion shows a reduction of the overall environment impact. The Marine Environment Protection Authority (MEPA) is the designated agency for the approval of dispersant use. The procedures for obtaining written approval for using chemical dispersant from MEPA are covered under Section 40 of Marine Pollution Prevention Act No.35 of 2008. The procedures including making application to use dispersant, testing and approving of dispersant are further explained in regulation 32 of Offshore exploration for and

[3] Regional Oil and Chemical Pollution Contingency Plan for South Asia was developed for five South Asian countries namely Bangladesh, India, Sri Lanka, Maldives and Pakistan, under the funded project jointly undertaken by SACEP and the IMO.

exploitation of natural resources including petroleum regulation No.1 of 2011. (Piyadasa, 2014) Until now, no policy had been formulated for the use of dispersant in Sri Lanka.

11. Pakistan - The Pakistan Maritime Security Agency (PMSA) is responsible for assisting and coordinating, prevention and control of the effects of marine disasters including pollution and implementation of international agreements and conventions in Pakistani waters. National Oil Spill Contingency Plan was formulated by PMSA and was incorporated as part of the comprehensive National Marine Disaster Contingency Plan (NMDCP). According to the NMDCP, containment and recovery of spilled oil is to be preferred. However, dispersant use can still be considered in some instances, e.g., when the spill is limited and not widespread. (NMDC, 2007)

Category III - Countries with no dispersant policy

1. The Maldives – The oil pollution legislation and policies in the Maldives to control and prevent marine pollution is limited. No operational National Oil Spill Contingency Plan, including dispersant policy, is available at present as it is still in the drafting stage. The Transport Authority under the Ministry of Transport and Communication is responsible party for dealing with sea transportation and maritime safety. Meanwhile, the Maldives Coast Guard has the mandate for the oil pollution response in the country and also has in house oil spill contingency plan. There is a limited amount of oil spill equipment held by the Coast Guard. (Gunasekara, 2015)
2. Myanmar – Details of the response policy in Myanmar are not known except that neither a dispersant approval process nor an approved dispersant list has been established at present. The formulation of the dispersant policy by the national authority is underway.

3. Vietnam – The Ministry of Natural Resources and Environment (MoNRE) is the government body guiding the use of dispersants in oil spill response and promulgating the list of approved dispersant to be used in Vietnam waters. Article 24 of Prime Minister Decision No. 02/2013/QD-TTg (Title: Promulgating the regulation on oil spill response) states that only dispersants permitted by MoNRE are allowed to be used, and only if other recovery methods are considered inappropriate. However, the policy on dispersant approval and dispersant use, as well as the list of approved dispersant in Vietnam have not been promulgated as yet.

DISCUSSION

In the event of a spill, the overarching goal of the response community is to quickly determine the response strategy and the combination of response tactics which will minimize the impact on the environment. The main response options considered for a major offshore oil spill include Mechanical Containment & Recovery, In-Situ Burning and Dispersant Application. Each of these response tools has its own place in a response depending on the specifics of the incident. Experience has shown that dispersants may be a critical success factor in the event of large offshore oil spills and well-established regulations for their use are important.

For the Asia Pacific region, the issues concerning dispersant approval process can be broadly categorized into the two themes discussed below.

1. Issues relating to dispersant approval process

While most of the countries studied in the region have established policies on dispersant use, there is still more work to be done to for its successful implementations. Incomplete information to complex multiple-approval processes for use could have the potential to prevent the swift implementation of dispersant strategies during a response. For most countries in this study, very

limited or no information on dispersant policies was available in public domain and in most cases, the information was available only in local languages. Discussions with international dispersant manufacturers identified this to be a complicated issue that often leads to lengthy and expensive product approval process in many countries. The table below (Table 4) summarizes the status of approval for some of the international dispersants identified:

Table 4: Asia Pacific Approval Status for the Global Dispersant Stockpile

S/N	Country	Global Dispersant Stockpiles		
		Slickgone® NS	**Corexit® 9500**	**Finasol® OSR 52**
1	Australia	Yes	*Yes?	No
2	Brunei	Yes	Yes	No
3	Cambodia	Yes	No	Yes
4	China	No	No	No
5	Hong Kong	No	Yes	No
6	India	No	No	Yes
7	Indonesia	No	No	Yes
8	Japan	No	No	No
9	Malaysia	Yes	No	Yes
10	New Zealand	Yes	Yes	No
11	Philippines	Yes	No	No
12	Singapore	Yes	Yes	Yes
13	South Korea	No	No	No
14	Thailand	Yes	Yes	Yes
15	Vietnam	No	No	No
	No of countries approved =	9	7	6

In terms of dispersant product approvals, a trend that became apparent following the Macondo incident was a push by the countries in the Asia Pacific region for local products. A few countries in the region now only have locally produced dispersants in their national product schedules. While these actions may be intended to protect the local industry, they could have severe implications in terms of dispersant supply chain management in the event of a large offshore oil spill. Considering the volume of dispersants required for a long-term well blow out,

as evidenced by the Macondo release, the production capability of local dispersant manufacturers to support a large scale operation could be severely challenged. The logistical concerns such as availability of chemicals, application equipment and trained personnel are also of importance and may change a decision from positive to negative even in the face of the most favorable environmental conditions. Countries that list almost entirely local dispersants on their product schedules may find it difficult to get the same products elsewhere, as these are probably not listed in other countries. Local dispersants may also cause problems with application as dispersant spray systems will need to be calibrated to accurately apply designated dosages and to determine the spray system's effective droplet sizes and swath width as well as appropriate application speed and altitude. In order to determine dispersant application parameters, field testing must be done before actual application, a process that can cause significant delays to a time-sensitive operation.

2. Stakeholder perception and dispersant use concerns

In a number of countries, it is apparent that there is reluctance to consider the use of dispersants as a primary response option since mechanical containment and recovery is often given as the preferred option. For example, in some countries in the region, all other response methods must be exhausted before dispersant can be considered for use in an incident, a practice that could be a significant hindrance to timely dispersant operations.

It can be seen that there are inconsistencies in the approach towards planning for the use of dispersants in the region. For example, two countries that allow the use of dispersants as a first response strategy are Singapore and Brunei. However, both of these countries share a common sea boundary with Malaysia where the approval for dispersant application is comparatively

stringent and mechanical recovery is the preferred option for a response. All 3 countries are members of the ASEAN-OSPAR (Association of South East Asian Nations – Project on Oil Spill Preparedness and Response in the ASEAN Seas Area) project, the purpose of which is to provide mutual assistance in the event of an incident and the development of consensus among its members. This latter item is essential for managing major events amicably in a region where trans-boundary pollution is a reality.

As indicated above, the requirement that only locally manufactured dispersants are approved within certain countries can be a significant issue. More and more countries are now revising their approved dispersant lists and, in some cases, removing international brands, including the products in the Global Dispersant Stockpile. While this is done with the intention to protect local trade interests, it raises concerns regarding the effectiveness of these dispersants since there is often little available performance or toxicity data. Additionally, the question arises as to whether or not these local companies can produce sufficient quantities of dispersant to supply a major well control incident like Montara. These issues could have an implication with respect to plans for dispersant stockpiling and supply chain management.

Something that is worth considering is the manner in which Europe has dealt with complexities of multiple national regulatory frameworks. In particular, Europe has been especially active in the field of regulating dispersant use as outlined in the European Maritime Safety Agency (EMSA) Action Plan for Oil Pollution Preparedness and Response which was adopted in 2004. Following this, a number of workshops focusing on the issue of harmonization of dispersant testing and approval methods in EU member countries were held. In 2005, the first workshop on dispersants highlighted the variation that existed in approaches toward dispersant

testing and approval. This was followed with a second workshop, "Towards a harmonised approach in dispersant usage in the EU" in May 2008, to address concerns. (EMSA, 2008)

As is often seen in areas with multiple viewpoints and various complexities, it can be of significant value to learn from what has been done before and translate or tailor previous efforts to those that are currently being undertaken. The possibility for the Asia Pacific region to examine the regulatory frameworks employed in other parts of the world with respect to dispersant use and approval and how they may be used to their advantage could be useful.

CONCLUSION

Dispersants can be an effective response strategy when used appropriately. Options for quick deployment of resources and the potential for large area coverage make dispersant application a key response strategy when dealing with large offshore oil spill incidents or when sensitive shoreline resources may be threatened. The possibility that a "window of opportunity" may exist for dispersant use could be a key response constraint and country-specific regulations can play a significant role in determining whether this response option can be made available in a timely and effective manner.

Moreover, the high media attention and scrutiny following the Macondo well release has prompted some countries in the Asia Pacific region to take a highly conservative stand on dispersant- related policies. The general concerns about dispersants shared by decision makers and stakeholders have to do with their heightened risk perceptions relating to dispersants and dispersed oil. With this in mind, it is likely that efforts at building stakeholder engagement and developing and sharing risk communication tools can help address these issues and provide for a constructive dialogue about the potential benefits and trade-offs of dispersant use. The concepts of Net Environmental Benefit Analysis (NEBA) and Spill Impact Mitigation Assessment

(SIMA)-based decision making can provide the framework for discussions in the Asia Pacific region.

While many countries may already have robust spill response national contingency plans, it is important for industry to explore ways in which consistency around the regulations for the use of spill response tools, including dispersants, can be encouraged. This may entail sharing of information at regional conferences and workshops or it may be more focused if detailed discussions are needed. Potential vehicles should be identified for exploring how best to share spill response-related regulatory experiences and learnings.

A key role that industry can play in this engagement process is to provide science and experience-based support to advance decision making and policy building through the use of a variety of materials that have been developed recently during multiple API/IPIECA/IOGP joint industry projects. (API, 2016; IPIECA-IOGP 2017) There is no shortage of opinions about dispersant use. It is important that there be a sound basis on which decisions relating to those opinions are made.

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