Current Status of Oil Spill Response in Japan and a New Sensible Approach to the Issues

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This symposium occupies an extremely important position in terms of improving and strengthening Japan's response to oil spills, and I would like to express my appreciation to the Petroleum Association of Japan and everyone else involved for their efforts. The Maritime Disaster Prevention Center (MDPC) operates on the frontline of oil spill clean-up activities in times of emergency, and in peace times is directly involved in the education and training of onshore and offshore disaster prevention personnel. Following on from my presentation at the 2012 symposium, I greatly appreciate this opportunity to speak to this forum again.

I. The Maritime Disaster Prevention Center (MDPC)

When oil spills occur off the coast of Japan, the clean-up is addressed from two positions. The first is that of the polluter, or the Responsible Party (RP)—for example, shipowners and coastally-located petrochemical companies. The second is the government position, i.e., that of the state and local authorities. MDPC operates from the position of the former, the RP.

Under Japanese law, including the Act on the Prevention of Marine Pollution and Maritime Disaster and the Act on the Prevention of Disaster in Petroleum Industrial Complexes and Other Petroleum Facilities—referred to below as domestic law—the primary responsibility for the clean-up lies with the RP. The scope of that responsibility is recognized as including, for example, the obligation to take emergency measures, the obligation to engage in clean-up measures, and the obligation to provide assistance and cooperation.

It would be ideal that the RP could respond to the incident, mobilizing its own disaster control organization and using the equipment which the RP is legally obligated to store. However, in cases where oil spilled from an onshore facility has spread right across the port, the problem becomes more complicated, including coordination with local parties.

In such cases, in response to a request from the RP (shipowner, petrochemical company, etc.), MDPC concludes a contract with the RP on maritime disaster response measures. Then in case of an oil spill, it launches clean-up measures, and in cases of spills or fires involving highly combustible or highly toxic hazardous substances, it takes countermeasures that include confirming site safety and extinguishing fires.

MDPC's work is not limited to dealing with oil spills. In Japan, "maritime disasters" include spills of oil and toxic liquid substances into the sea, as well as fires at sea. MDPC consequently deals with maritime disasters at the site from the position of the RP and on behalf of the RP, with whom primary responsibility lies. Since 1976, we have dealt with more than 160 maritime disasters.

At an actual spill site, you cannot expect the Japan Coast Guard and other government institutions involved in marine pollution issues take strong leadership and decide clean-up strategies and tactics.

Specifically, the local Coast Guard Office convenes a liaison meeting bringing together private sectors and administrative institutions involved with the incident. The main purpose of this meeting is to explain the RP's clean-up activities in public waters to interested local parties and obtain their agreement. In other words it can be a local community consensus-building meeting. MDPC represents the RP, making best-efforts to obtain consensus on the content of Incident Action Plans (IAPs) and the completion of clean-up activities, planning and implementing efficient and effective clean-up operations with a balance among environmental, economic, and policy factors.

MDPC has a staff of around 60 and only two large-scale fire-fighting ships. However, at key ports we conclude pre-contracts with port-related private firms engaged in tugging, port and warehousing services (hereafter "subcontractors"), commissioning them to store and maintain our booms, oil skimmers, protective equipment and fire-fighting equipment. We also provide them with education and training to maintain and improve our response system.

MDPC needs to strengthen its partnership with its subcontractors at key ports and, in the event of an incident, deal with maritime disasters on behalf of RPs while working to build local community trust. As a professional maritime disaster response group, MDPC is convinced that preparedness during normal times is critical to determining the success of responses in times of emergency.

Learning from the responses to large-scale oil spills following the Great East Japan Earthquake on March 11, 2011, at the end of March 2013 we expanded and developed our bases in Kawasaki, Sakai-Senboku, and Kita-Kyushu to create disaster countermeasures depots. These three depots are equipped with everything from oil spill clean-up equipment to lathes, tools, and easily transportable container offices, so that clean-up activities can proceed self-sufficiently because, if port facilities suffered major damage from a large-scale natural disaster, oil spill equipment in the damaged port cannot be used and there are difficulties in obtaining goods required for clean-up activities such as rope and tools.

On October 1, 2013, the status of MDPC changed from an independent administrative agency to a general incorporated foundation. Over the 37 years we have built up our capability to respond to hazardous substance incidents, which is composed of three skills of safety, firefighting and clean-up, and also equipment. Taking this opportunity of change in the MDPC's status, we are preparing to provide our response capability to deal with hazardous substance disasters on land. We will continue honing our skills as a private disaster response organization so that we can be of use in emergencies.

II. Oil Spill Response: Current Status and Issues

1. Use of Dispersants—Timing and Misconceptions

In readiness for maritime disasters including oil spills and fires in coastal facilities, MDPC has concluded Maritime Disaster Safety Service (MDSS) contracts with 197 petroleum- and chemical-related operators (as of January 1, 2014). This service is one of the pre-contract services and includes advance planning and mobilization of MDPC's response teams when requested.

As part of this service, MDPC offers on-site training on effective deployment of oil booms and use of booms improvised from ladders and adsorbents, etc.

The most common questions during such training concern dispersants. Many participants have serious misunderstandings, believing that use of dispersants is prohibited, or that their use requires permission from the Japan Coast Guard or the fishing industry.

Domestic law obligates all oil tankers, oil storage facilities and mooring facilities of a certain size to keep dispersant on hand. Dispersant is a chemical agent designated by law. Likely oil discharge amounts are prescribed by law depending on the size of the facility, and 10–20% of the set amount is supposed to be removed by dispersants. For this reason, the government treats dispersant as a legally designated material and sets extremely strict certification standards for dispersant types (testing of emulsification rates, aquatic toxicity, etc.).

Domestic law stipulates that chemical agents cannot be used for oil clean-up unless they are specified by the Ministry of Land, Infrastructure and Transport (MLIT) for use for preventing pollution due to oil, etc. and compliant with technical standards determined by ministry ordinance. The law also imposes penalties for infringements. Thus the use of household detergents to remove oil floating on the sea is prohibited. Given that dispersant is a legally designated chemical agent, can be used by a small number of people and has an immediate effect, MDPC takes the following steps.

MDPC attends the oil spill incidents and instructs the ship's captain, facility manager or crew member to consider swiftly and correctly spraying dispersant as an effective emergency measure to deal with oil discharge from pipelines or gutters, just like using a fire extinguisher as the initial step in putting out a fire.

At oil spills in terminals and other facilities operated by a minimum number of employees, it would take an hour, or 30 minutes at the very least, to deploy a boom. Some employees would be tied up reporting to the relevant authorities, so only three people would be on site. In order to fulfill the legal requirement to take emergency measures, we recommend correct spraying of dispersant on the immediately affected area, such as the sea in front of the facility or around a grounded tanker, to protect fishing facilities and coastlines.

However, if it is confirmed that oil discharge is continuing and oil pollution is spreading over a wide area, in other words expanding into public waters and thus legally requiring clean-up measures to be taken, we fully consider the pros and cons of spraying dispersant and discuss the matter with members of the liaison meeting. We then have to decide on either full-scale clean-up tactics through spraying of dispersant, recovery tactics using mechanical skimmers, or a combination of both.

Oil from Sakhalin is transported by tanker through coastal waters off Hokkaido. Based on a scenario where a large oil spill occurred in coastal waters off Northern Hokkaido, which are a rich source of scallops, MDPC discussed possible responses with interested parties from the public and private sectors over two years. During the discussions, we considered that although the mechanical recovery option is environmentally friendly, it is difficult to secure vessels for the work and the area covered per unit of time ranges from just 1/10 to 1/100 of the area coverable by the dispersant spraying option. Conversely, although the dispersant spraying option has far higher coverage and dispersing rates per unit of time, damage caused by rumors relating to the introduction of chemical agents to the marine environment is a concern.

The outcome of the discussions was that after considering the trade-off between the two options, agreement was reached with the fishing industry on making dispersant spraying the main tactic and setting rules for dispersant spraying, i.e., establishing zones, such as waters where spraying has already been approved and those where spraying is to be discussed.

I hope that all those present here today will understand the correct methods for spraying dispersant and work to minimize damage.

2. Decontamination of Port Facilities

Large oil spills following the Great East Japan Earthquake have not been the only difficult challenge MDPC has faced. Contamination of ports following oil spills has caused some of our biggest past and present headaches. The most serious issue at such sites is decontamination of port facilities including oiled docks and breakwaters.

Regardless of whether a spill comes from an onshore facility or a ship, the oil discharged spreads rapidly and sticks to docks and berths where cargo handling was

due to take place. Oil then adheres to the hulls of ships that sail in and out of the harbor. If ships due to load or unload are kept waiting while oil sticking to docks is decontaminated, an issue of compensation claims looms. However, if a ship is forcibly held to dock, oil sticking to the docks adheres to its hull just like a stamp. If the ship loads, the worst outcome ensues. As you can imagine, oil adhering to its hull at the start of the loading process has gone underwater once the ship is laden, and then floats to the surface. If the ship sails out of harbor with oil adhered to it and continues its journey, it spreads the pollution by dragging an oil slick. It is transformed into a new source of oil pollution.

The first step of decontamination procedure for oil sticking to port facilities is preparation. Oil booms and sorbent booms are deployed on the water where decontamination is being carried out to prevent the spread of oil splashes. The second step is spraying or application of dispersants. Generally the function of dispersants is to disperse the layer of oil floating on the surface of the water, but in this case their role is to lift oil adhering to structures. Dispersants are not effective on floating layers of highly viscous oil, but in the case of dock decontamination it is possible to let dispersants penetrate for 30 minutes or more. They are then blasted off with high-pressure seawater.

Ideally all of the dispersants sprayed or applied are effective on all of the oil adhering to structures, and if the entire amount can be dispersed, the rest of the process can be left to oil-decomposing bacteria and oxidative decomposition. However, some problems arise here. The first is aversion to using dispersants. Unlike offshore clean-up activities, where dispersants are sprayed as a clean-up option while emphasizing the trade-off against other options, in port decontamination chemical agents are sprayed in the presence of the general public. Moreover, since the waters are shallow and enclosed within the port, it is particularly difficult to gain consensus from the fishing industry.

Additionally, as a physical problem, since industrial water cannot be used as it would be onshore, the high-pressure washers utilize seawater and impurities in the seawater cause frequent nozzle blockages. This creates delays in the decontamination schedule, affecting cargo work of ships scheduled to arrive on subsequent days.

So what do we do if we cannot reach a local community consensus on spraying or

applying dispersants? Since no time can be lost in starting decontamination, we use a high temperature and high-pressure seawater to lift oil adhering to structures. As you can imagine, we have trouble with the reliability of the water-heating boilers (due to the swaying of the small vessels used for the work) and nozzle blockages.

3. Ship Decontamination: Use of Dispersants and Determination of Operation Zones

Decontamination work is not limited to port facilities such as concrete docks and breakwaters. Whether large or small, ships oiled on their hulls while sailing through polluted waters, ships moored at the docks and ships used in clean-up operations all give rise to the problem of decontamination.

Since oil adhering to any of these becomes a new source of pollution, we need to systematically decontaminate their hulls as far as possible. Generally, the ideal solution is to do this in waters where decontamination will have less environmental and economic impact, considering both the efficiency and the safety of decontamination operations.

The waters around industrial complexes located along the Pacific belt are the most congested area in Japan. Coastal fishing also flourishes in these waters, and in certain seasons edible seaweed is cultivated in some places. If ships are decontaminated in waters outside the port area of industrial complex, there is an extremely high probability of secondary damage. However, if such work is conducted far out at sea, strong surface currents and difficulties with secure anchoring of the ships being decontaminated make it impossible to ensure the safety of small vessels doing the work. At present, the only option is to spray or apply dispersant as the chemical agent for lifting oil adhering to hulls. Given this situation, we have to struggle to obtain consensus from the fishing industry.

As mentioned above, resolving “decontamination problems”—a term often heard recently and the largest challenge which MDPC faces at pollution sites—has become one of the big issues for MDPC.

III. A New Sensible Approach to the Issues

Prior to the Great East Japan Earthquake, MDPC resolved decontamination problems on a site-by-site basis, but large-scale oil spills in ports during the disaster made it necessary for us to establish fundamental solutions to such problems.

In collaboration with Neos Company Limited, from late 2012 we began research and development on an adhered oil remover.

Our ideal adhered oil remover would let the oil float after lifted, not like chemical agents such as dispersant that disperses oil adhering to port facilities as it lifts it, so that we could recover this floating oil with small skimmers. If we could develop such chemical agent, it would be easier to gain consensus from port authorities, port users, and the fishing industry. Moreover, if we could avoid the physical obstacles associated with high-temperature, high-pressure washers using seawater and continue decontamination with easily obtainable normal-temperature, low-pressure seawater pumps, we could implement efficient and effective decontamination plans.

You might think that simply using a dispersant as an adhered oil remover would save the cost of recovering oil deliberately floated and processing recovered oily water. However, judging on the basis of all the points I have talked about, including rejection of the use of dispersants, pressure to recover oil not completely dispersed by dispersants, and complaints about secondary damage caused by dispersed oil, we believe there are major benefits in recovering oil that has been lifted with adhered oil remover.

Although I am unable to go into further details due to confidentiality and patent issues, I can confirm that our new remover meets the dispersant aquatic toxicity standards, and that development of a new adhered oil remover that will lift and float adhered oil is progressing smoothly. MDPC will set up a special committee to obtain knowledge further from academic experts and specialists to start manufacturing it as early as possible as a chemical agent that is not an agent legally required to be stockpiled while meeting the MLIT standards for decontaminant agents used at sea, so that we can use it for the decontamination activities at sea.

Thank you for your attention.