The Operational Use of Dispersants in the United Kingdom

Introduction

The use of oil spill dispersants in the United Kingdom Pollution Control Zone has been an accepted operational policy for many years. Very detailed licensing and operational procedures are in place to ensure dispersants are used in the most efficient, effective and economical way directly linked to net environmental benefit.

This paper will cover four main areas linked to the operational use of dispersants in the United Kingdom.

Firstly a very brief history lesson with regards to pollution and salvage response in the United Kingdom. Secondly dispersant licensing issues and their use in the United Kingdom pollution control zone, thirdly some information on a recent sea trial involving the use of dispersant at sea on a variety of oil types in UK waters; and finally the resources available to the Maritime and Coastguard Agency to combat a major spill of oil linked to the use of dispersants.

Some History

The UK has been unfortunate in experiencing, and having to respond to, three of the top twenty oil spills in the world. We are therefore well rehearsed in dealing with such disasters. However, each incident brings its own particular problems. There are always lessons to be learnt.

1967 was the first time the attention of the world was turned on the UK for a major pollution incident. The Torrey Canyon ran aground between the Isles of Scilly and Land End – the south-western corner of the UK. She was carrying 117,000 tonnes of Kuwait crude. After a failed salvage attempt she was eventually bombed to burn off the remaining 20,000 tonnes of crude oil.

The UK Parliamentary response to this incident was to enact the Prevention of Oil Pollution Act of 1971 and the associated intervention powers. These are now enshrined in the Merchant Shipping Act 1995 and Marine Safety Act 2003. The incident also provided the catalyst for International maritime Organisation (IMO) 1969 CLC/1971 Fund regime for liability and compensation regimes.

Such an event was unplanned and unparalleled. The UK had no National Contingency Plan, no national stockpiles, no emergency towing vessels, and no policy to deal with such a disaster. In effect no prevention, preparedness or response strategies. Pollution control was, at this time, still a relatively minor concern for IMO and member countries.

Time drifted on. It was human error that caused the accident, it was considered unlikely to happen again and the incident faded in the public conscience. In the background, the world and in particular IMO, began asking questions about measures in place to prevent oil pollution from ships, along with issues of liability. This incident was the catalyst for the adoption of MARPOL and a host of initiatives linked to the protection of the marine environment.

In 1978 the AMOCO CADIZ grounded off the Brittany coast, this time In French waters. The incident happened one month after the 1978 International Maritime Organisation (IMO) Conference on Tanker Safety and Pollution Prevention. The tanker held 223,000 tonnes of crude oil.

The EXXON VALDEZ grounding during 1989 in Prince William Sound and the subsequent birth of the Oil Pollution Act 1990 (OPA90). The IMO Oil Pollution, Preparedness, Response and Co-operation Convention (OPRC) was also coming to fruition.

Time drifted on again. It was the UK's turn in 1993 when the M/V BRAER went onto rocks at Garth Ness, at the southern tip of the Shetland Islands. She was fully laden with 84,700 tonnes of Norwegian Gullfaks crude and some 1,600 tonnes of heavy fuel oil bunkers. The weather was atrocious, storm force winds and mountainous seas. There were all the makings of a major economic and ecological disaster for the local community and environment. If there was a silver lining in the cloud it was the fact that Gullfaks is a very light and volatile crude with very low asphaltene content which the high winds and exceptional seas were largely able to disperse. The consequences though were still serious. This was the second major spill, ranked in the top twenty of all worldwide spills that the UK had to contend with. On this occasion the UK did have a National Contingency Plan and associated resources in place. Dispersants were used on the oil slick.

As with all major incidents and disasters there are always lessons to be learnt. After the Braer incident Lord Donaldson of Lymington was appointed chairman of the enquiry. The subsequent report, Lord Donaldson's Inquiry into the Prevention of Pollution from Merchant Shipping, detailed no less than 103 recommendations to Government. The report is more commonly referred to as Safer Ships, Cleaner Seas. The recommendations were very wide ranging, encompassing all aspects of global shipping. The report principally concluded that whilst much work was already being done, there was a pressing need for the United Kingdom to take new initiatives locally, regionally, nationally and internationally.

The UK response was adapted and updated in light of some of the recommendations in safer Ships and Cleaner Seas. This was in conjunction with IMO OPRC Convention requirements. The UK had yet to accede to the OPRC Convention, but had many of the requirements in place, for example a National Contingency Plan. Safer Ships Cleaner Seas led directly to the establishment of Emergency Towing Vessels in the UK.

The clock ticked on. In February 1996, the SEA EMPRESS grounded, oddly enough just a day after a major UK oil spill exercise, and the subsequent salvage operation unfolded before the eyes of a startled nation. This third incident ranked in the global top twenty of all pollution incidents from shipping had occurred in UK waters.

The incident attracted enormous public interest and provided the news media with headlines for several days as efforts to salvage the tanker and prevent massive oil pollution unfolded before the cameras of the world. 130,018 tonnes of Forties light crude oil threatened to pollute UK waters. She had run aground on the final approaches to the port entrance, pilot on board. The weather was fine and clear with a west northwesterly force 4/5 wind. Both engines were put astern, both anchors were deployed, but the vessel continued ahead and ran aground 5 cables to the northeast of the original grounding position. Oil immediately began escaping from the ship. It was a disaster, a national disaster of the worst kind, again, in a highly environmentally sensitive area. Again dispersants were used on the oil slick.

Lord Donaldson conducted a Review of Salvage and Intervention and their Command and Control. It was generally agreed there was a text book clean-up operation of the pollution both at sea and on the shoreline. There were however possible enhancements with regards to the operational response to salvage and intervention. The outcome of Lord Donaldson's Report was to dramatically alter the way that the UK responds to maritime casualties.

It was an opportune moment. The Coastguard Agency and Marine Safety Agency were being amalgamated to form the Maritime and Coastguard Agency (MCA). The future maritime response for the UK was being altered accordingly to reflect some of the 26 recommendations made in Lord Donaldson’s report.

The four main theatres of activity

In light of Lord Donaldson’s report the UK considers now four main theatres of activity:

Firstly **Search and Rescue**. This is co-ordinated by Her Majesty’s’ Coastguard at one of eighteen rescue centers in the UK. HM Coastguard is a part of the MCA.

Secondly **Dealing With the Casualty**. This, in marine terms, is the salvage element of the business. At the time of a marine casualty, where appropriate, the UK government encourages a contract, usually Lloyds Open Form, between the owners and a reputable salvor. The decisive voice in this equation is the Secretary of States Representative (SOSREP), who has the ultimate control of the salvage operation, usually through the Salvage Control Unit (SCU). Note that: no action, once informed via an MRCC, means tacit approval to the salvage operation.

Thirdly **At Sea Clean Up**. This is through a Marine Response Center (MRC) set up in the port area or nearest suitable MCA premises. The control of the unit is initially by the port. As the incident grows beyond a tier 2 then MCA take control as required. This control cell deals with all of the issues concerned with dealing with oil afloat including the use of dispersants.

Fourthly **Shoreline Clean Up**. This is controlled by a Shoreline Response Centre (SRC) and managed by local authorities. MCA supports and provides advice to the local authorities in the establishment and running of the SRC.

Environmental considerations are catered for by the establishment of an Environment Group, provided advice to the three cells, namely the SCU, MRC and SRC. Standing environment groups are established around the UK. The chair is nominated at the start of an incident. Environmental Liaison Officers sit within the SCU, MRC and SRC cells to provide all aspects of environmental advice.

The National Contingency Plan

These operational response arrangements are detailed in the MCA National Contingency Plan. This plan also highlights the resources central government has at its disposal. Such resources must clearly dovetail with local and regional plans of all the ports and harbours in the United Kingdom. All such plans are encompassed by the OPRC requirements.

One important key to preparedness includes some 180 ports and harbours to have approved OPRC Oil Spill Contingency Plans. These ports are considered to be the highest risk. In addition several hundred Offshore Plans have also been approved encompassing Oil and Gas exploration, development and production. A number of these plans nominate dispersants as an option for combating pollution.

To support the OPRC concept the UK has implemented accreditation schemes for responders, trainers, and port and offshore installation operators. The British Oil Spill Control Association and the Nautical Institute administer these schemes on behalf of the MCA.

Introduction to dispersant

Thoughtless and uncontrolled use of chemicals in the sea or on the shoreline to treat oil can cause more problems than would have occurred if the oil had been left alone. This may be due to the toxicity of the chemicals themselves or because the chemicals disperse oil into the water column where the dispersed oil in high concentrations could affect fish and shellfish living below the surface of the sea.

In some cases however, dispersant use can be very effective in preventing damage to wildlife and contamination of recreational beaches by removing oil from the surface of the sea or the shoreline. For these reasons the UK Government has set up a regulatory and advisory regime to protect the environment from indiscriminate use of dispersants and to encourage appropriate use of dispersants and other chemicals where this would be beneficial to the environment.

The licensing authorities

The statutory licensing authorities responsible for approving dispersant products for use at sea are as follows:

?? Department of Environment for Rural Affairs (Defra), England and Wales
?? Scottish Executive for Environmental & Rural Affairs Department (SEERAD)
?? Environment & Heritage Services, Northern Ireland (EHS)

Licensing Authority approval is not *formally* required where dispersant use is restricted to those parts of a beach above the height of mean high water spring tides or in situations where products are only applied manually not involving the use of aircraft, vessels or where approved products are used in deeper water more than one mile away from the 20 metre contour line.

There are however situations where there are no or minimal restrictions on dispersant use where environmental damage may nonetheless be caused by inappropriate use. The licensing authorities therefore encourage anyone proposing to use oil dispersants or other oil teatment products to consult the appropriate Licensing Authority in advance on all proposals to use oil dispersants.

Using dispersants

Under the terms of the UK Food and Environment Protection Act (FEPA) 1985 and the Deposits in the Sea (Exemptions) Order 1985, it is a legal requirement that dispersants may normally only be used in UK waters if they have been formally approved for this purpose by the licensing authority.

In addition, specific permission from Defra, SEERAD or EHS must be obtained under this legislation before any dispersants are used in shallow waters – these are defined as any sea area which is less than 20 metres deep, or within one nautical mile of such an area. This covers all areas submerged at Mean High Water Springs including any use in tidal docks and locks and on beaches, shorelines, or structures such as piers and breakwaters.

Use of approved dispersants in deeper waters is generally less likely to cause damage and is therefore not subject to the same restrictions as inshore use. Although certain small scale manual clean up operations and those taking place above Mean High Water Springs, are not subject to the provisions of FEPA, any inappropriate use of dispersants or other chemicals can cause significant damage to important fisheries, nature conservation areas and economic utilities such as power stations with seawater intakes.

It is therefore of utmost importance that anyone proposing to use oil dispersants consult the Licensing Authority in advance on any proposed use of dispersants even on a small scale and only use approved products.

I should also mention that approved dispersants can, exceptionally, be used without prior consultation with the licensing authority in *force majeure* situations where there is a genuine risk to human life or to the safety of an installation or vessel – for example, where there is a serious danger from fire or explosion.

Detailed guidance on the appropriate use of oil treatment products is given in the Defra booklet “The Approval and Use of Oil Dispersants in the UK”. In addition there is a website which is continually updated to provide a comprehensive list of approved dispersants in the UK.

The booklet stresses that for many oil spills, the best option is to leave the oil to disperse and/or degrade naturally, or use another form of intervention may be appropriate for example mechanical recovery or the use of containment booms.

Spraying dispersant is not appropriate for all types of oil - for example, diesel, gas oil and other light oil types usually disperse readily and therefore do not require treatment. Sea conditions, tides and a number of other factors are also important in determining whether dispersant use is the most appropriate response. In addition, there is a wide range of oil treatment products available which have different properties and may be suitable for use only on certain types of oil and under certain sea conditions.

Good contingency planning is the key to the successful use of dispersants. Some of the oil spill plans in the UK which encompass larger estuaries, for example Humber Estuary, have pre-agreed strategies for such use. Detailed sensitivity maps clearly indicate where the use of dispersant is appropriate. Further detail includes very comprehensive information of particular environmental and fisheries sensitivity.

If a port or statutory harbour considers it necessary to include dispersant use as a strategy then it can apply for a standing approval from the licensing authority. This establishes a permission which allows the use of an appropriate quantity of a specified dispersant product on a spill without having to seek specific Licensing Authority approval at the time of the incident. This is designed to facilitate rapid response to a minor spill in areas where there are no special environmental sensitivities.

In order to obtain a standing approval, a request must be made in writing to the Licensing Authority at the same time as a draft oil spill contingency plan is submitted for agreement.

Any dispersant products held in stock (whether by commercial organisations or government stockpiles) must be tested for efficacy at the appropriate intervals.

If dispersant has been transferred from the manufacturer's packaging (e.g. poured from the drum into a bulk tank on a vessel) then it must be retested for efficacy every 5 years after manufacture. If the dispersant remains sealed in the manufacturer's original packaging then the retesting can be delayed but must be carried out after 10 years and thereafter every 5 years.

Approval of a dispersant product

There are several issues to address when considering the approval of a dispersant product for use under the licensing regime. These include two main areas; the testing of a dispersant's specifications and effectiveness, and secondly testing a dispersant for toxicity.

Dispersants are tested for conformity to a number of attributes. These include dynamic viscosity, flash point, cloud point, miscibility and efficiency. The efficacy test assesses the proportion of the total volume of oil treated that is dispersed into the water column.

There are two toxicity tests. The first ensures that the relative toxicity of an oil/dispersant mix is no greater than the toxicity of the oil alone (Sea Test using the brown shrimp Crangon crangon). The second ensures the toxicity of dispersant alone is not greater that the toxicity of the oil alone (Rocky Shore test using the common limpet Patella vulgata). All dispersants must initially pass both tests and any further reapproval or rebranding.

The recent UK sea trials

As stated previously the UK has used a dispersant based capability for many years. Backing up this requirement have been many sea and laboratory trials. The recent sea trials off the Isle of Wight, United Kingdom are typical of such on-going trials. The UK is fortunate in that it is still possible to conduct such trials under very strict controls. In many parts of the world now this is no longer the case.

Many studies of oil spill dispersant effectiveness have been conducted around the world using a variety of laboratory test methods in recent years. The results from these laboratory tests indicate that the viscosity of spilled oil, together with several other factors, influence the effectiveness of oil spill dispersants. Higher viscosity oils are generally more difficult to disperse than lower viscosity oils, particularly after emulsification.

The relationship between dispersant effectiveness and oil viscosity is not linear. There appears to be a narrow range of viscosity value which, when exceeded, prevents dispersants from being effective. However, this limiting oil viscosity varies with different test methods. While, it is reasonable to suppose that different laboratory test methods represent, to some degree, different sea states, this cannot be proven since no laboratory test method is an accurate simulation of the complex mixing processes that occur at sea.

The results from laboratory test methods give good relative results; the effect of different dispersant treatment rates and differences between the effectiveness achieved on various oils by different brands of oil spill dispersants appear to be significant. However, the results from laboratory test methods cannot be translated in an absolute way to likely performance of dispersants on spilled oil at sea. This can be a major disadvantage when using the available information to plan for the operational use of oil spill dispersants.

The methodology

The sea-trials attempted in part to provide a 'calibration' of existing laboratory test results to dispersant performance at sea. These sea-trials differed from previous studies conducted at sea using different viscosity levels and particular dispersants and dispersant treatment rate to create a matrix of dispersant performance.

Previous sea trials had used a limited number (from 2 to 5) of slicks of relatively large amounts (10 to 50 tonnes) of test oils. In contrast, the 2003 sea trials had the potential to use combinations of 4 oils, 3 dispersant and 3 dispersant treatment rates to produce 36 test oil slicks of much smaller volumes of 10 or 20 litres.

The 4 test oils used were IFO-80, IFO-120, IFO-180 and IFO-380 fuel oils. IFOs (Intermediate Fuel Oils) are graded by their viscosity at 50ºC; IFO-180 has a viscosity of 180 cSt at 50ºC.

Unlike crude oils IFO properties do not change rapidly when spilled on the sea, they are readily available and do not require special shipment conditions due to their low flash point. IFO-180 and IFO-380 are the typical HFOs (Heavy Fuel Oils) that are carried as ships bunkers in medium to large ships.

The 3 oil spill dispersants used were Agma Superconcentrate DR379, Corexit 9500 and Superdispersant 25. These three dispersant represent 60% of the UK government stockpiles. Corexit 9500 is not on the UK approved dispersant list, but is available in other parts of the world and has been extensively studied in laboratory tests. However existing government stocks of this product can still be used.

The 3 dispersant treatment rates used were DORs (Dispersant to Oil Ratios) of 1:25, 1:50 and 1:100. A DOR of 1:25 is the typically recommended dispersant treatment rate, but some laboratory studies have indicated that dispersants could still be effective when used at the lower treatment rates. Since this would yield significant cost savings and operational advantages, DOR was included as a variable. Minimising dispersant quantity used whilst achieving optimal dispersion may further reduce overall environmental impact.

Oil release and dispersant spraying was carried out from the barge Willcarry. Oil Spill Response Limited (Southampton) with the assistance from Briggs Marine Environmental Services (Aberdeen) provided the technical and operational capability to deliver this.

Test oils were laid down onto the sea as a 20 metre long strip through a Delta type skimmer head as the barge sailed directly into the wind at two knots. Dispersant was sprayed at the required rate onto the oil layer shortly after it was deposited on the sea. Some UVF (Ultra Violet Fluorometry) to measure dispersed oil concentrations was carried out from a small boat at one metre depth.

The main method of assessing dispersant effectiveness was by visual observation by a panel of experts including representatives from CEFAS, CEDRE, ITOPF, MCA and OSRL. A Coastguard boat and a chartered diving boat provided the platform for these experts and other observers to the trials. All test runs were coded and randomised so that the precise combination of oil, dispersant and treatment rate was unknown to the experts and observers.

The experts used a standardised reporting form, specifying the degree of observed dispersion, and other effects, on a four-point scale which comprised; not occurring or not obvious; slow and partial dispersion; moderate dispersion; rapid and total dispersion.

The dispersion can be reliably observed by visual means, provided that the observer is close to the treated oil when subjected to wave energy. There are several visual clues that dispersion is occurring; the most obvious is that the water in the wave crest appears brown or black, rather than clear, because of the dispersed oil. Another visual indication is the presence of individual dispersed oil plumes that can be briefly seen as the cresting wave temporarily removes the surface oil slick.

The matrix approach to these sea trials ensured that all possible degrees of dispersion, from ‘no dispersion at all’ to ‘total and rapid dispersion’ would occur at different oil / dispersant brand / dispersant treatment rate combinations. The selected test sequence ensured that observers would be able to observe a wide range of dispersant performance. Subsequent analysis of the results from these sea trials showed that the 6 or 7 expert observers independently, and without discussion, recorded very similar observations.

The sea trial was intended to be held over 3 days; Monday 23rd to Wednesday 25th June. The sea was too rough for testing on the 23rd with wind speeds gusting to 28 knots. The sea was too calm for testing on the 24th due to a total absence of cresting waves. Testing with IFO-80 began on the 25th, but abandoned for safety reasons as the wind speed exceeded 20 knots by midday.

Testing took place on Thursday 26th and Friday 27th June with wind speeds varying between 8 and 14 knots. A reduced test programme was carried out because of the delay caused by the unsuitable sea conditions. Tests concentrated on using IFO-180 and IFO-380 since early tests showed a clear distinction in dispersant effectiveness between these two oils.

Initial results

The initial results were interesting. At this stage the report is draft and requires further analysis. As such I will make no reference to dispersant brand types. I can summarise the results as follows:

?? The IFO-180 fuel oil used in these tests (which had a viscosity of approximately 2,000 cP at sea temperature) was rapidly and totally dispersed by one dispersant at 12 knots wind speed when applied at a DOR of 1:25. The two other dispersants were not as effective but still caused a reasonable degree of dispersion of IFO-180 fuel oil.

?? At lower wind speeds of 7 – 8 knots one dispersant at a DOR of 1:25 was less effective, but still caused moderately rapid dispersion of IFO-180.

?? The IFO-380 fuel oil used in these tests (which had a viscosity of 7,000 to 8,000 cP at sea temperature) was not rapidly and totally dispersed by any of the three dispersants when used at treatments rates ranging from DORs of 1:25 to 1:100.

- At wind speeds of 13 - 14 knots with the associated increase in wave energy, the performance of two dispersants used at a DOR of 1:25 improved to produce moderately rapid dispersion of IFO-380. The other dispersant was not so effective.

The results are still being analysed, compared with laboratory test results and a comprehensive report including photographs of the sea trial is being written.

Initial conclusions

Some of the initial conclusions can be summarised as follows;

- All three dispersant brands tested achieved more than the minimum required in the Warren Spring Laboratory (WSL) efficacy test, but they showed significant differences in performance at sea. The performance of a particular brand of dispersant at sea is a function of oil viscosity, dispersant treatment rate and prevailing wind speed linked to fetch and sea state.

- The IFO-180 fuel oil used in these tests could be totally and rapidly dispersed by one dispersant used at a DOR of 1:25 at 12 knots wind speed. The other two dispersants were somewhat less effective, but still caused moderate dispersion when use at a DOR of 1:25.

- The IFO-380 fuel oil used in these tests (which had a viscosity of 7,000 to 8,000 cP at sea temperature) was not rapidly and totally dispersed by any of the three dispersants when used at treatments rates ranging from DORs of 1:25 to 1:100 at wind speeds of 7 – 9 knots., but moderate dispersion was achieved with two of the dispersants used at a DOR of 1:25 at wind speeds of 13 – 14 knots.

Summary points

In summary the following should be considered;

- The sea trials have shown that the amount of wave generated mixing energy is a particularly important aspect for the successful dispersion of relatively high viscosity oils. It has long been known that the rate of enhanced dispersion of dispersant-treated, initially low viscosity crude oils significantly increases when a significant amount of breaking wave action is present.

- It should be noted that the different grades of IFO fuel oils were not taken as being typical or representative of all fuel oils of these IFO grades, since HFOs vary very widely in properties such as Pour Point.

- With the factor of wind speed there appears to be a more marked effect with the higher viscosity IFO-380 fuel oil used in these sea trials. There is some transition from very little dispersion at 7-9 knots wind speed, through to moderate dispersion at 12 to 13 knots. This trend may continue, so that there would have been rapid dispersion of the IFO-380 fuel oil at 20 knots or higher wind speed. Unfortunately, although such higher wind speeds were encountered during the intended test period, it was not safe to proceed with the testing which involved relatively small boats that were 10 nm offshore.

- ?? It seems very likely that spilled oils with a similar viscosity to that of the IFO-380 used in these sea trials (7,000 – 8,000 cP at sea temperature) could be rapidly dispersed at winds speeds higher than 13 knots, but below the operational limit of 30 to 37 knots.

- ?? The sea trials were conducted with freshly spilled fuel oils; there was no time for evaporation or emulsification to occur before the oils were sprayed with dispersant. This was an intentional element of the experimental design and was used to limit the number of variables being studied.

- ?? Dispersants that all achieve the minimum efficacy level in the WSL test for Defra approval purposes are not equivalent in their performance with oils at sea.

- ?? The sea trials demonstrated that there are significant differences between the performances exhibited by different dispersant brands.

- ?? Prior to the trials it had been considered by some that certain dispersant brands were considered very much more effective in treating heavy fuel oils. The trials did not confirm this. However, the trial results still did indicate certain dispersants were slightly more effective at dispersing the IFO-380, but there is insufficient data to tell whether this is significant or not.

- ?? Any operational use of dispersants has to use nominal dispersant treatment rates; the amount of spilled oil is rarely known and the oil slick varies greatly in thickness from place to place. Experimental design features ensured that all the test oils were sprayed more accurately with dispersant than could ever be achieved at a real oil spill.

- ?? In most laboratory test methods, the required amount of dispersant can be added very evenly and precisely to the test oil. The dispersant is added drop-wise to a confined area of oil and is allowed to soak in before the treated oil and seawater are mixed. Some of these test results have indicated that some dispersants can be effective on some oils at a treatment level of a DOR of 1:100 or even 1:200. If dispersants could be used effectively at a quarter or one-eighth of the recommended treatment rates, there would be significant savings in cost and operational complexity.

- ?? The results from these sea-trials show that there is the expected effect of dispersant treatment rate; less dispersant is less effective.

- ?? Very low dispersant treatment rates of 1:100 or less are not practical when dispersants are used outside of laboratory tests. The dispersant losses caused by wind-drift and the inaccuracies encountered during any dispersant spraying operation at sea mean that greatly reduced treatment rates cannot be recommended for dispersant use.

The way forward

The trials were successful due to the overwhelming support and co-operation from regulators, moderators, responders and industry. A common objective was sought and achieved. It is hoped that further trials will be carried out using this very successful collaborative approach.

From an operational perspective the door has been opened with regards the use of dispersants for higher viscosity oils. The trial has clearly indicated that certain IFO - 380 products could be dispersed using an appropriate dispersant at a high treatment rate with acceptable environmental and energy conditions.

Any future response in the UK will always start with a trial spray from an aircraft or surface vessels with an appropriate monitoring regime.

UK dispersant resources

The Tricolor incident is one such example of the use of dispersants at sea. This car carrier capsized to the north of the Dover Straits. An accidental release of IFO–380 when a barge rammed the ship led to an International effort to attempt a test spray of the released oil. Belgium and France agreed to the use of the UK dispersant resources for a test spray. However, due to a low cloud base the attempt was aborted. It does however indicate a step change in policy for countries now considering the use of dispersants.

The resources that were planned to be used including the MCA contracted Cessna 406 aircraft with composite spray pod. This can fly at 130 knots from a height of 30 feet and is able to deliver up to 1.5 tonnes of dispersant. It also has a night time capability. This is usually the resource for conducting a test spray.

Also under contract to the MCA are two Lockheed Elektra aircraft modified for dispersant spraying. Each can deliver up to 15 tonnes of oil dispersant at very low level. Both are required to be at the nominated forward operations base loaded with dispersant and ready to spray.

Both dispersant spraying aircraft have to be operationally supported by a surveillance aircraft. The MCA have two contracted aircraft, a Cessna 404 and a Cessna 406. Both are on 30 minutes readiness by day and two hours by night. All of the aircraft contracts are with Air Atlantique Ltd, Coventry.

To support the aircraft, dispersant stockpiles are located in eleven locations. There are seven different types with a total of 1500 tonnes.

Some ports and harbours also have a dispersant capability usually using surface craft, for example tugs. This includes a standing approval mentioned previously in this paper.

The Offshore industry has a substantial capability through local regional and national resources from surface stand by and supply boats with pre-fitted spray equipment and dispersant. In addition all operators have contracts with tier three providers for example Briggs Marine Environmental Services and Oil Spill Response Ltd. This includes the Aerial Dispersant Delivery System (ADDS Pack).

At the start of this paper reference was made to some incidents specific to the UK and how the UK has suffered three of the top twenty spills as categorized by ITOPF. It is very interesting to note that 50% of spills in this ITOPF top twenty list occurred in European Commission waters. This is an unfortunate statistic.

The recent ERIKA and PRESTIGE incidents have raised the profile of such tanker incidents. The various Erika packages (linked to the Erika disaster) and associated European Directives have far reaching consequences.

Incidents involving very large tankers appear to be on a downward trend. The International Tanker Owner's Pollution Federation (ITOPF) and the Advisory Committee on the Protection of the Seas (ACOPS) statistics confirm this trend. Bunkers though are increasingly a threat. Some of the medium sized ships can carrier substantial quantities of bunkers.

The KODIMA is one such example. This timber carrier grounded in severe gales in Cornwall, SW England last year. There was pollution, principally from the timber deck cargo lost and jettisoned overboard in an attempt to stop the ship listing in the hurricane force winds. This was not a national incident but still posed a threat of significant pollution. A successful salvage operation under the overall control of SOSREP, supported by the MCA, minimised the release of bunkers.

So the risks are not just limited to tankers. The UK has dealt with other recent incidents where the threat of pollution was from the ships bunkers and not necessarily from the cargo. To have an effective response to any given incident you need to consider all available strategies. This includes options for a mechanical, dispersant and leave it alone strategy.

The UK is very fortunate in that it is part of a very developed and effective OPRC regional agreement through the Bonn contracting parties. The resources of Bonn offer a powerful arsenal in the fight against any forms of marine pollution.

There is always a temptation to concentrate on oil pollution but marine pollution covers the majority of substances. The new HNS (Hazardous & Noxious Substances) Convention and the OPRC-HNS protocol should address this. The UK does not need reminding about the threats posed by HNS cargoes. The Ievoli Sun sank in the English Channel recently with Styrene, Methyl-Ethyl-Ketone and Iso- Propyl Alcohol. Most of the pollutants were recovered over a period of 6 months.

In summary the UK has dealt with the full gambit of incidents ranging from capsized fishing boats in the vicinity of fish farms, cargo ships with substantial quantities of bunker fuel oil, HNS incidents affecting both land and marine pollution, to very large tankers with hundreds of thousands of tonnes of crude oil on board.

Each incident is different. The UK has a highly developed prevention and preparedness strategy for these types of incidents. The primary prevention tool in the UK is the four emergency towing vessels in the UK. This is linked to a robust command and control system linked to places of refuge for ships in distress and the SOSREP function.

Hopefully the dispersant capability will never have to be used. The MCA is not complacent though. The risk remains in both UK and all European waters. The UK National Contingency Plan is a living document. There will undoubtedly be future incidents with associated outcomes, lessons learnt and recommendations. These will have to be taken on board and further enhancements and adjustments made to the National Contingency Plan.

And finally the Maritime & Coastguard Agency vision,

SAFER LIVES, SAFER SHIPS, CLEANER SEAS

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