Responding to Spills in Remote Locations: GULSER ANA (Madagascar) & OLIVA (South Atlantic)

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ABSTRACT

Over the years, ITOPF has regularly attended incidents in relatively remote locations with limited response capacities and/or limited contingency planning arrangements in place. In these instances, remoteness is generally characterised by the lack of general infrastructure, in particular a transport system, and/or a low density human population. The absence of ports or terminals which is often associated with a relatively limited traffic of large commercial vessels often means that such locations are generally considered as low risk areas from an oil spill preparedness point of view.

When an incident in a remote location results in the release of significant quantities of persistent oil, the scale of the response may be beyond the capacities of the local authorities in charge of the emergency, and assistance with both the organisation and implementation of the response is often required. In such situations, typical issues such as accessibility to shore, transportation of personnel, equipment and waste, as well as health and safety of responders can become real challenges.

In recent years, ITOPF has been involved in a number of incidents that could be classified in the remote location category. This paper aims to highlight the usual challenges that arose during the response of two such incidents and how these were addressed.

INTRODUCTION

On 26th of August 2009, the bulk carrier GULSER ANA (built 1985; 23,802 GT) ran aground on the southern coast of Madagascar near Faux Cap. At the time of the incident, the vessel was loaded with 39,250 metric tonnes (MT) of rock phosphate and had 568 MT of heavy fuel oil, 66 MT of diesel oil, and 8 MT of lube oils on board. Within a few days the vessel suffered serious structural deterioration which resulted in a significant oil spill and loss of cargo, further losses of decreasing quantity continued in the following months. By the end of 2009, the entire cargo and oil onboard had been spilled at sea. Overall, approximately 47 km of sandy beaches were impacted discontinuously within a 70km stretch of shoreline. Although it was observed dissipating into the sea, no cargo was ever observed to have washed ashore. Faux Cap consists of a basic settlement on the coast with multiple small farming villages inland interlinked by sandy tracks. It is home to a few thousand inhabitants and is characterised by a lack of infrastructure, vehicles and supplies. The nearest airport is located in Fort Dauphin, a 7 hour drive away. The capital of Madagascar, Antananarivo, is 1,200 km to the north and approximately 3 days by road.

On Wednesday 16th March 2011, bulk carrier OLIVA (built 2009; 40,170 GT) laden with a cargo of 65,000 tons of soya beans grounded early in the morning on Nightingale Island. Nightingale Island is a small uninhabited island which is part of the Tristan da Cunha group in the South Atlantic and is the most remote inhabited archipelago in the world, lying 2,816 kilometres (1,520nm) from the nearest land, South Africa. Tristan da Cunha is part of the British overseas territory of Saint Helena, Ascension and Tristan da Cunha and is formed of four main islands, Tristan

da Cunha, Inaccessible, Gough and Nightingale. Adjacent to Nightingale Island are two small islets, Middle Island and Stoltenhoff Island. Tristan da Cunha Island is approximately 18nm North of Nightingale and has the only settlement within the islands, Edinburgh of the Seven Seas, with 262 inhabitants. Inaccessible Island is approximately 10nm to the North West of Nightingale. Nightingale is a seabird sanctuary hosting many endemic and endangered species in large numbers (more than 2 million pairs of birds) including the northern rock hopper penguin. At the time of the incident, the vessel was also carrying 1,420 tonnes of HFO 380 and 74 tonnes of Marine Diesel Oil onboard. On Friday 18th March, OLIVA split in two in rough seas spilling significant quantities of oil; the forward section became buoyant and initially floated eastwards along the northern shore of Nightingale before drifting back westwards to eventually settle on the south western shore of the island. After a few days, both sections became almost completely submerged.

INITIAL ASSESSMENTS

In both cases, ITOPF attended on site shortly after the vessels broke up leading to significant spillages of oil. Given the remoteness of both locations, initial arrangements were made to travel to locations as close to the incident sites as possible but with sufficient infrastructure to facilitate the organisation of a response. In Madagascar, this site was Fort Dauphin and in South Africa it was Cape Town. From these bases various means of transportation (road, aircrafts, or vessels) were used to reach the actual spill location.

Given that the spill locations could not be reached quickly, the respective sensitivities of the affected areas were assessed remotely and then refined once on site. Similarly, the fate and trajectory of the spilled oil was assessed using the

information available from various sources such as the UK Met Office or Meteo-oceanographic data providers at the time the vessels broke apart. In Madagascar, the main sensitivities were related to subsistence fishing as well as a small, but essential, commercial lobster fishery and a number of freshwater wells located along the shorelines which were used by both humans and cattle for drinking water. Sensitivities in Tristan da Cunha were linked to the seabird breeding populations and their well known vulnerability to oil and to an economically important lobster fishery.

In both incidents, a salvage operation was rapidly launched although in both cases, no salvage of vessels, their cargo or bunkers proved possible. In the OLIVA incident, given the oil threat to the seabirds, bird rehabilitation equipment for 500 birds was loaded onto the salvage tug SMIT AMANDLA and a bird specialist joined the salvage team.

PLANNING AND LOGISTICS

Once on site in Madagascar, and from Cape Town for the OLIVA, response plans were drafted based on all the information available from site, either from the islanders and the salvage team in Tristan da Cunha or from initial on-site observations in Faux Cap. Arrangements were made to secure logistical support such as vessels and/or aircrafts, response equipment, health and safety material and specialised personnel.

Vessels

The main challenge in the response to the OLIVA incident was to charter appropriate vessels to transport the mobilised equipment and staff to the remote islands. In this respect, the UK Foreign and Commonwealth Office approached the

South African government early on to explore the possibility of one of their Environment Protection and Fishery patrol vessels to be made available to be chartered. Unfortunately, these diplomatic efforts did not succeed. In the meantime, efforts were made throughout southern Africa to locate other suitable vessels that could potentially be chartered to assist with the response logistics. Two vessels were eventually sourced, the offshore SVITZER tug SINGAPORE (LOA: 75m) on its way from Namibia to South Africa and the Russian Polar Research and Supply vessel, IVAN PAPANIN (14,184 GT; LOA: 166m) returning from a support mission in Antarctica. SINGAPORE left Cape Town on 29th March and reached Nightingale and Tristan da Cunha on 4th April loaded with bird rehabilitation equipment which was given priority over the shoreline response equipment. Six bird rehabilitators and ITOPF joined the crew. After loading of the shoreline clean-up equipment, IVAN PAPANIN left Cape Town on 7th April and reached Tristan da Cunha on 12th April.

Aircraft

In Madagascar, transportation of the salvage and oil specialists as well as various ministerial level government representatives was provided with the help of a local helicopter firm, Madagascar Helicopter, based in Antananarivo. The aircraft was primarily used: (1) to transport personnel from Fort Dauphin to clean-up bases in Faux Cap and Anjapaly, (2) to undertake condition/ salvage surveys of the wreck, (3) to undertake extensive and frequent aerial surveys of shoreline contamination, (4) to position heavy equipment on the shoreline and (5) to visit remote fishing villages along the coast to gather seafood samples for contamination testing.

With respect to the response to the OLIVA spill, the size of IVAN PAPANIN and the presence of a helipad and hanger onboard also allowed the chartering of a helicopter to assist with the overall response and safety of the operation. Again, the helicopter was used for aerial surveillance, to transfer heavy equipment and personnel to and from the vessel, and to transfer the waste from Nightingale Island to the vessel at the end of the clean-up operation.

Ground transportation

In Madagascar, various means of ground transport were required for the operation. Quad bikes were used on a daily basis to carry out surveys, manage and bring equipment to clean-up teams. Additionally, 4x4 trucks and vans were used to bring personnel, material, and equipment from Fort Dauphin. Larger trucks, such as specialist heavy duty (6x6) trucks were used to transport the heaviest equipment from further afield. The greatest transport challenge encountered was the shifting of hundreds of tonnes of waste from the beaches to the final treatment plant near Antananarivo (see below).

Base Camp

In Madagascar, operations from September through to November 2009 were led from Faux Cap, where clean-up supervisors rented a number of huts for both accommodation and to house the materials stockpile. In early 2010, once more specialised operations intensified some distance from Faux Cap, the command post was shifted to a camp that was set up with the approval of the local authorities in the vicinity of Anjapaly (approx. 23km east of the GULSER ANA wreck). The camp

operated from the end of January until operations ceased in the second week of March, 2010.

RESPONSE

Bird Rehabilitation Operation

Given the threat to the penguin population in Tristan da Cunha, plans were made to significantly scale up the initial bird rehabilitation effort initiated with the salvage operation. Consequently, the Southern African Foundation for the Conservation of Coastal Birds (SANCCOB) was contracted to mount and manage a penguin rehabilitation operation. The necessary equipment was prepared in Cape Town and then shipped to Tristan da Cunha.

A number of facilities were set up on the island for the cleaning and rehabilitation of the birds and included: a stabilisation and feeding area, an intensive care unit for the weakest birds, a washing unit and a waterproofing area. There were multiple factors involved in the high mortality rate, the most significant being that the birds were oiled at the end of their three week moulting cycle during which time they had not fed and were therefore already weak, in addition to the time necessary to plan and deploy a response operation to the remote group of islands.

Clean-up Contractors and Equipment

In both incidents, the clean-up arrangements relied on the same general principle. A specialist clean-up contractor, Le Floch Dépollution, was hired to manage the shoreline response and provide spill managers and specialist equipment. Additionally local contractors, Adonis recup'oil in Madagascar, and Drizit

and SMIT in South Africa provided trained staff and equipment. The labour was provided by people hired from the local populations who were trained and provided with the appropriate personal protective equipment (PPE).

Shoreline Clean-up

In Madagascar, shoreline clean-up was carried out after an initial assessment based on an aerial and ground survey. Priority areas were defined and addressed according to the sensitivity and level of oiling observed and the clean-up techniques used were based on the type of substrate and degree of oiling. Given the lack of mechanical equipment, clean-up relied largely on manual labour for the collection of light to moderate oiling in the form of tarballs and for the removal of buried oil in beaches and submerged oil in shallow lagoons. A second phase of clean-up was necessary on heavily oiled rocky areas, which involved flushing and high pressure washing techniques using seawater. The specific equipment necessary for this operation had to be shipped from the Le Floch Dépollution base in France.

For Nightingale, the shoreline response equipment was selected based on both photographs and information of shoreline oiling directly following the incident from people already on site and from discussions with Tristan da Cunha's Administration. It consisted of the typical equipment and materials used to clean-up rocky shorelines, e.g. flushing equipment, high pressure washing equipment, pumps, small skimmer heads, sorbent material, self standing tanks, waste handling material and personal protective equipment. Appropriate campsite gear and safety equipment were also taken. In terms of staff, a total of 6 bird rehabilitators, 4 spill responders

and 6 salvage divers together with an ITOPF Technical Adviser were deployed. A paramedic and two cooks completed the response team.

The clean-up response objective was directed at removing the threat to the wildlife of the island by removing the bulk oil from the rock surfaces. Given the natural cleaning potential, the porous nature of the volcanic rock and the environmental sensitivities of the island, the response objective was not to remove all traces of oil. The initial approach in all areas was to manually scrape and recover the thick bulk oil from on and around the pebbles, boulders and bedrock. This was then followed by a combination of medium pressure flushing and high pressure washing. Sorbent boom, pads and pom-poms were used to recover the released oil and minimize oil entering tidal pools and the open sea. No detergents or degreasers were applied to the shoreline.

Waste Management

In both cases, waste storage was organised according to recognised international standards from the initial stage of the clean-up operation.

In Madagascar, all collected waste followed the same route. Oily sand and tarballs were collected and placed directly into strong, plastic bags. At all times, it was ensured that the individual bags carried no more than 10-15kg of waste to ensure that they could be safely carried by hand and remain intact. From the many work sites, the numerous small waste bags were first gathered in temporary beach storage areas and from there, they were transferred to truck-accessible, pre-approved, and protected intermediate storage sites. Transfer to these sites was carried out using either a 6x6 quad bike or 4x4 pick-up trucks where possible,

locations with more difficult access relied solely on manpower. As the operations progressed, these temporary storage sites were emptied and the waste transferred to a depot especially set up in a local town where large, long-distance trucks could be loaded. At the end of operations, the waste was finally transferred to a specialist site near the capital Antananarivo.

The final disposal of the 335 tonnes of solid oily waste and 50 m^3 of other waste (e.g. PPE, sorbent) collected in Madagascar was carried out by Le Floch Dépollution at the Adonis Recup'oil facility in Ambatomirahavavy in July 2010. The disposal route for the 50 m^3 of PPE and sorbent was incineration in the Adonis Recup'oil incinerator. The solid waste was treated and neutralised using quicklime as proposed and described in the Clean-up Plan submitted to the authorities in the initial stage of the response.

The quicklime used in the process was shipped from France in May-June 2010. To stabilise the 335 tonnes of waste, 112 tonnes of quicklime were mixed in thoroughly using an excavator. Finally, the remaining neutralised material (sand) was used as raw material for construction within the Adonis Recup'oil facility.

All of the oily waste collected during the OLIVA response, including bulk oil, oiled sorbent materials and oiled PPE, were initially placed into heavy duty plastic bags and sealed with a cable tie. The individual bags were then placed into 1m^3 capacity bulk bags. The transfer of the bulk bags from the island to the IVAN PAPANIN was carried out with the helicopter. Onboard IVAN PAPANIN, a purpose-built bunded area was constructed using layers of cardboard, plastic liner and geo textile. The

edges of the bunded area were raised so as to prevent oil from escaping the area. All oily waste was disposed of in South Africa.

CONCLUSIONS

Responding to oil spills in remote locations, as illustrated in the examples above, presents a number of challenges. First and foremost, the issue of access and transportation for personnel, equipment and waste to and from the spill site is paramount and influences the entire response arrangements. Consequently, this should be addressed as a priority.

Additionally, health and safety arrangements, although always a key aspect of oil spill response, are particularly amplified by the lack of infrastructure and communication links in remote locations.

Whilst the steps required to respond to any oil spill are similar, regardless of the degree of remoteness of the location, the assessment phase is of particular importance when scaling a response in a remote location as any mistake or shortfall regarding the necessary equipment and materials will result in significant delays and difficulties in the implementation of the response operation. A direct consequence of the remoteness and associated logistical and transport challenges is space limitation (e.g. onboard a vessel) which means that trade-offs and prioritised choices might be necessary.

Following the incidents described in this paper, the same overall principle was applied to respond to the pollution incidents. Professional responders with experience in dealing with the various aspects of the response (shoreline clean-up,

seabird rehabilitation) were hired to manage the overall response. The local population were then hired as operators and trained and equipped to carry out the different response tasks. From the equipment point of view, locally found equipment and materials were purchased or hired whereas more specialised equipment was shipped from Europe by a leading response contractor. The waste generated was transferred to appropriate facilities (overseas in the OLIVA incident) and disposed of according to national regulations. In both incidents, all plans and decisions were submitted and approved by the relevant administrations, i.e. an incident inter-ministerial commission led by the Ministry of Transport in Madagascar and the Tristan da Cunha Administration respectively.