

Regional Tier 2 Aerial Dispersant Service in West Africa

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Abstract

In many areas of the world the Oil Industry is required to have a Tier 2 response capability as a result of legislation within their area of operation. In others, the response capability is created through oil industry mutual aid agreements.

Most oil facilities have some form of Tier 1 response relevant to their operational risk assessment, and in many cases the Industry is covered globally by Tier 3 centres to deal with major incidents. However, response times to different areas of the world vary greatly depending upon logistical arrangements and the chosen strategy. In some cases when there is an increased risk and / or a delay in delivering a response to an area, an alternative 'gap filling' solution may be required. For this reason it was decided to develop a response at Tier 2 level in the rapidly expanding oil provinces of West and Central Africa (WACA), to support the local capability and augment any Tier 3 response.

In this paper the author examines the process followed in establishing a Regional Tier 2 aerial dispersant Service to the offshore operators in the Gulf of Guinea. The drivers behind the project will be discussed and how support from industry was canvassed. The paper will describe the technical advancements that had to be made to existing technology, and how diplomatic and logistical hurdles were overcome.

The Service came on line in late 2003, and could prove to be a cost effective response model for other Regions.

TEXT

Background

Due to a change in legislation covering operations in the British sector of the North Sea, a new service was offered to industry in 1999 to deliver a rapid Tier 2 response within the time structure permitted. Up until this time many operators had their own Tier 1 cover, but looked to Tier 3 for a more robust response. There was obviously a gap in the capability.

The new legislation laid down that an aerial dispersant response aircraft capable of tackling a Tier 2 incident had to be able to be on scene within 6 hours of mobilisation. In certain circumstances this was possible utilising existing technology in the form of a 5,000 gallon aerial system installed in an L382 aircraft. However, this could not be guaranteed within the time structure to all operating fields. A new form of aerial response had to be introduced.

The UKCS Service, (United Kingdom Continental Shelf), gave industry an option to have a 1.25 tonne payload of dispersant on scene within the required time, backed up by state of the art surveillance equipment offering infra red images. The payload is carried in an externally mounted pod, under the belly of a Cessna 406 aircraft.

Since the successful implementation of this service, it has been seen that there is a very real opportunity to utilise this strategy in other parts of the globe. West Africa has proven to be the first.

Demand for the Service

The introduction of an aerial dispersant strategy in the North Sea was driven by legislation. The coastal countries in the West and Central Africa (WACAF) region are not covered by such legislation, despite the ever increasing levels of oil exploration and production. Most of the activity is off-shore, with rigs and the increased use of Floating Production Storage and Offloading vessels (FPSO), linked by networks of seabed pipelines. Although there are many new fields opening, there are also many others reaching maturity with ageing infrastructure increasing spill risk.

Environmental conditions may not be as severe as in other parts of the world, but strong currents and the effect of monsoon conditions would hamper any containment operation during much of the year. Ashore there are delta areas covered in mangrove, and steeply shelving sand beaches with poor load-bearing characteristics. The effect of the large river systems can be felt hundreds of miles offshore, around which there are areas of both commercial and subsistence fishing.

Logistics within the Region of West and Central Africa has proven in the past to be a hurdle over which many an operation has stumbled. Poor diplomatic relations between neighbouring countries increase the difficulty of moving men and equipment over borders

whether by land or sea. The very topography of the region, the nature of the forests and lack of wealth in the past has also limited the establishment of rail and road networks.

There are at the present time no shared Tier 2 facilities in WACAF, although in individual countries large stockpiles of equipment exist. The reliability and maintenance of this equipment is often not up to a standard where it can guarantee support to a response.

To introduce an aerial service to WACAF, one important factor was needed above all others, and that is an oil type that is amenable to the use of dispersants. This is the case, with the oils produced by the Angolan fields in the south, to the fields off Cote d'Ivoire having a high API. The oil exported from Chad in the Cameroon Pipeline was again found to be easily dispersed, a fact which is aided by the high water temperature of the sea far exceeding the pour point of the oils.

The above factors led industry to believe that an established Aerial Dispersant Base within the Region was the way forward to have a guaranteed and shared response.

Marketing and Researching the Project

Having two or three of the operators showing an interest in the Service was not good enough to go ahead with development. There are over a dozen Oil Companies operating off the coast in the WACAF Region, and as with all co-operatives the more members to the service, the more cost effective it would be for all.

The first months of 2003 were spent in discussion with local business units of the Oil Companies to market the idea, and arrange dates when it would be convenient to hold seminars. These were carried out in the Cameroon, Gabon and Equatorial Guinea, with delegates attending from all the companies. Support for the project was given in principle, and development of the system was given the go ahead once a suitable aircraft provider was found. Several suitable aircraft providers were found, but one above all others met the criteria.

To guarantee the service at least one aircraft had to be in Region at all times, with a minimum of two trained and experienced crews. In order to achieve this two aircraft would have to be adapted for the service so as to cover for technical and unplanned commitments. Training of the flight crews in the techniques of aerial surveillance was carried out the year before the service was due to come on line. In this training a number of helicopter crews were included, as these aircraft are utilised to assist the fixed wing operation.

The Region to come under the cover of the Service extended from Angola to Cote d'Ivoire, and therefore operating bases had to be found in a number of countries. In order to be effective dispersant spraying must be a fast response, so logistical arrangements for stockpiles were put in place at this time. Four tonne stocks of dispersant were located in Luanda, Port Gentil, Malabo and Abidjan. At each of these airports there is also a loading system for the aircraft, consisting of pump, hoses and the necessary connections contained in a secure container, the keys being held by the nominated Oil Company call-out authority. The tank module itself is held at the central location of Malabo Airport, where the aircraft is based.

Response to the Region

There are a number of differences to the Service provide in the Gulf of Guinea, in comparison to that in the UK.

Firstly there is the aircraft type. In UKCS a number of Cessna 406 aircraft are used for aerial surveillance and for dispersant spraying. In the WACAF service the most suitable aircraft found was a Banderante, a twin engine 16 passenger aircraft. Being of a larger size there is the advantage of increased payload and longer range (1650km), with a speed of 380 km/hr.

The dispersant tank for North Sea operations is a 1.25m³ pod, fixed under the airframe as is a carrier for increased luggage capacity. Certain modifications to the airframe of the chosen aircraft were necessary to allow for the added stress of the external payload. In the WACAF service however the aircraft providers went the way of researching an internal tank, with a 2 tonne capacity. The design and authority approval for this tank undertaken by 'Naturelink' of Pretoria, the aircraft provider, and was achieved inside a period of 4 months. This was perhaps possible as similar systems had been used in Africa for mosquito control spraying.

Call-out and procedures for operations follow a similar pattern. All the companies wishing to use the service pay an annual subscription dependant on their risk banding, of which there are 3 levels. When the aircraft is in use they must also pay for block hours flown, the direct operating costs (eg landing fees and fuel), and replacement of the dispersant used.

Each member company must nominate a number of authorised call-out authorities, employees who may call upon the service and have the authority to approve the necessary

budget. There is a single point of contact for call-outs, the Duty Manager in Southampton. He produces an aircraft Work Order, and passes the details of the operation to the 24 hour Pretoria Control Room, who mobilise the aircraft.

Although based in Malabo, the aircraft is free to operate in the Region, providing it can be back and ready to fly dispersant operations within 6 hours. This includes loading of system and dispersant, and the provision of a fresh flight crew.

To release the dispersant for operations a call is made to the key holding Oil Company, who mobilise the stockpile, and arrange for further loads if required. Should dispersant operations be lasting beyond a couple of days there is a very real possibility that the incident is over the capability of Tier 2, so the enhanced ability of Tier 3 would have been called upon.

Operations to date

It was decided that a real time exercise would be run in November 2003, just weeks after the introduction of the service. This was to test the notifications, mobilisation, loading and logistics of the service.

However a week before this event was due, the service had its first real call-out. A major Oil Company operating off-shore Gabon had a leak from a sub-sea pipeline, leading to the loss of several hundred barrels of product.

The call came to Southampton from Gabon, and the Naturelink aircraft was alerted in Malabo. It was part loaded with dispersant for the flight south, during which aerial surveillance took place to identify and quantify the slick. The Banderante rendezvoused with a helicopter which assisted with pinpointing spray operations, after which it returned

to Port Gentil for reloading with the full capacity of dispersant. Operations continued until the next day, when the remaining oil was considered to be of no significance and the aircraft was stood down to return to Malabo.

Had the Tier 2 service not been on offer the alternative would have been a costly mobilisation of Tier 3 spraying, Tier 1 use of helipods and boatspray systems which may have led to shoreline impact, or an attempt at offshore containment if the resources could be deployed in time.

An incident less than one month after this one further proved the success of this service as a robust strategy. A call from an operator in Nigerian waters due to a failure in a shore facility tank farm led to the aircraft flying repeated operations out of Equatorial Guinea airspace into that of Nigeria. This kind of operation may be taken for granted in many parts of the world, but was a point of concern in West Africa. Naturelink however have good understanding with all the aviation authorities in the region, which eases the process of gaining consent to over fly different countries airspace. It is of course essential that for this service to prove a success, Oil Companies and Governments must work together in cross border co-operation.

The successful implementation of the WACAF aerial dispersant service is a model for introducing similar strategies in other parts of the globe. Wherever dispersant application has proven to be the correct strategy for operational and diplomatic reasons, there is the potential to add a regional tier 2 base(s) to supplement and assist Tier 1 and 3 responses.