

Preparedness Planning in Remote East Africa



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ABSTRACT

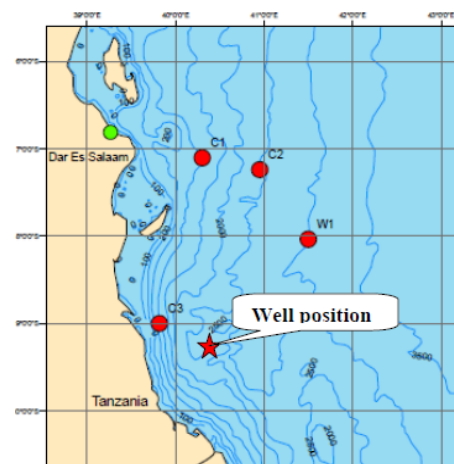
In early 2012 Statoil drilled a deep-water offshore exploration well in Block 2, Tanzania. In keeping with Statoil's corporate standards an Environmental Risk Assessment (ERA) and Oil Spill Response Analysis (OSRA) were conducted prior to an Oil Spill Response Plan (OSRP) being developed.

This paper highlights the findings of both the ERA and OSRA with respect to Tanzania; the additional planning and deliverables that were required; and the intensive stakeholder engagement undertaken by Statoil throughout the planning process.

INTRODUCTION

In January and February this year, Statoil drilled a deep-water offshore exploration well, Zafarani – 1, in Block 2, off the coast of Lindi District, Tanzania. The Zafarani – 1 well is situated approximately 80 km north of the supply base in Mtwara.

Water depth at the well location is estimated to be 2,592 m. The well was drilled vertically with a deep-water drilling unit (drill-ship) to well target depths (TD) of 4300 m or more below mean sea level.



As the exploration drilling was to involve planned operational discharges and the possibility for unintentional spills to sea, Statoil contracted Oil Spill Response Limited (OSRL) to conduct an ERA and OSRA as part of the well planning. Based on the results of both these an Oil Spill Response Plan (OSRP) was established and all relevant technical and organizational systems installed and implemented before the drilling commenced.

Environmental Risk Assessment (ERA)

The ERA evaluated the risk for acute spills to sea. To enable the ERA to be conducted oil spill modeling (for which current data had to be obtained through research buoys) was conducted. Blowouts during drilling into the reservoir zone were classified as major incidents. Minor incidents included small operational spills of crude oil, diesel, drilling mud or hydraulic oil. All assessments of environmental risk and oil spill emergency preparedness were based on the dimensioning incident, a blowout.

The ERA also required sensitivity maps to enable accurate impact assessments to be made. Statoil together with a local environmental consultancy, Samaki consultants, the University of Dar Es Salaam and OPSCOM (a GIS consultancy) established an atlas of the entire coastline.

The ERA was of paramount importance in the preparedness process as the oil spill modeling indicated a Ramsar site, Mafia Island Marine Park, the Rufiji-delta with the largest standing mangrove forest in East Africa and the Songo-Songo archipelago all were in the influence area of an oil spill incident.

The ERA concluded that all operations were found to be of low to medium risk. Below is the summary table of the risk posed by all scenarios considered.

CONSEQUENCE				FREQUENCY					
People	Environment	Assets	Reputation	Practically non-credible occurrence	Rare occurrence	Unlikely occurrence	Credible occurrence	Probable occurrence	Likely / Frequent occurrence
Slight health effect / injury	Slight effect	Slight damage	Slight impact				S7, S8, S9, S10		
Minor health effect / injury	Minor effect	Minor damage	Minor impact			S3			
Major health effect / injury	Local effect	Local damage	Local impact		S5, S6				
PTD or 1 fatality	Major effect	Major damage	National impact		S4				
Multiple fatalities	Extensive effect	Extensive damage	International impact		S1, S2				
Multiple fatalities	Permanent Extensive effect	Permanent Extensive damage	International impact						

Oil Spill Response Analysis (OSRA)

The purpose of the OSRA was to identify what emergency preparedness systems were required to combat a potential oil spill, and to confirm that the resources would be available within acceptable response times.

The system requirements were calculated using equipment manufacturer's specifications and assumed efficiencies for dispersant application. The purpose was to demonstrate the minimum level of preparedness required to meet Statoil's performance requirements.

The main purpose of any oil spill emergency preparedness is to minimize environmental damage. The combat strategy was primarily based on dispersant application and mechanical cleanup close to the source.

The dimensioning scenario for Zafarani – 1 was defined as a subsea blowout from the Zafarani formation for duration of 127 days and a rate of 5700 m³/day. The modeling indicated that oil would strand on the shoreline, the shortest timeframe was within 36-48 hours (with no mitigation measures).

Statoil’s definitions and performance requirements for Tier 1, Tier 2 and Tier 3 were determined by the project. The following definitions were applied:

- Tier 1 = spills ≤ 500 tonnes oil
- Tier 2 = spills > 500 tonnes and ≤ 2000 tonnes oil
- Tier 3 = spills > 2000 tonnes oil

Performance standards were set for all tier levels. Figure 1 shows that the above response options would recover or disperse the Tier 1 requirement after approximately 30 hours – prior to any stranding.

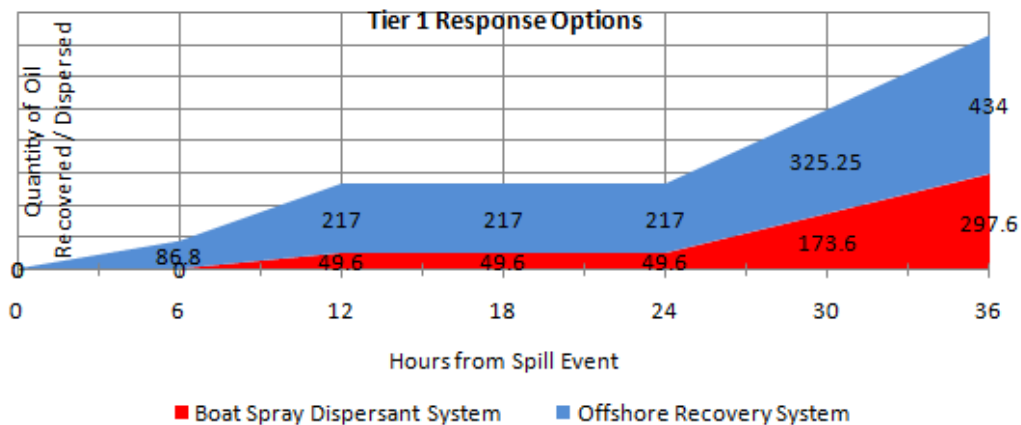


Figure 1 Response options recovery chart for Tier 1

The evaluation for Tier 2 identified there was a need for an additional small dispersion aircraft to fulfill the performance requirement for Tier 2 volumes, although two offshore containment and recovery systems (to NOFO specifications and supplied by MMB) and three vessel dispersant systems were available.

In-situ burning was considered as a potential response strategy for Tier 2 however was discounted on the assumption that approval for use would not be granted by the Tanzanian authorities (as a Tier 2 response option). To calculate the systems required for a Tier 3 response the dimensioning scenario was assessed, the worst case scenario. Based on the assessment additional systems were identified:

- Oil Spill Response Large Aircraft – mobilization time assumed to be 48 hours, second system potentially available after 96 hours.
- Oil Spill Response In-situ burn equipment – two systems, mobilization time assumed to be 72 hours. Through engagement with stakeholders was anticipated approval would be given for in-situ burn for an uncontrolled well release.

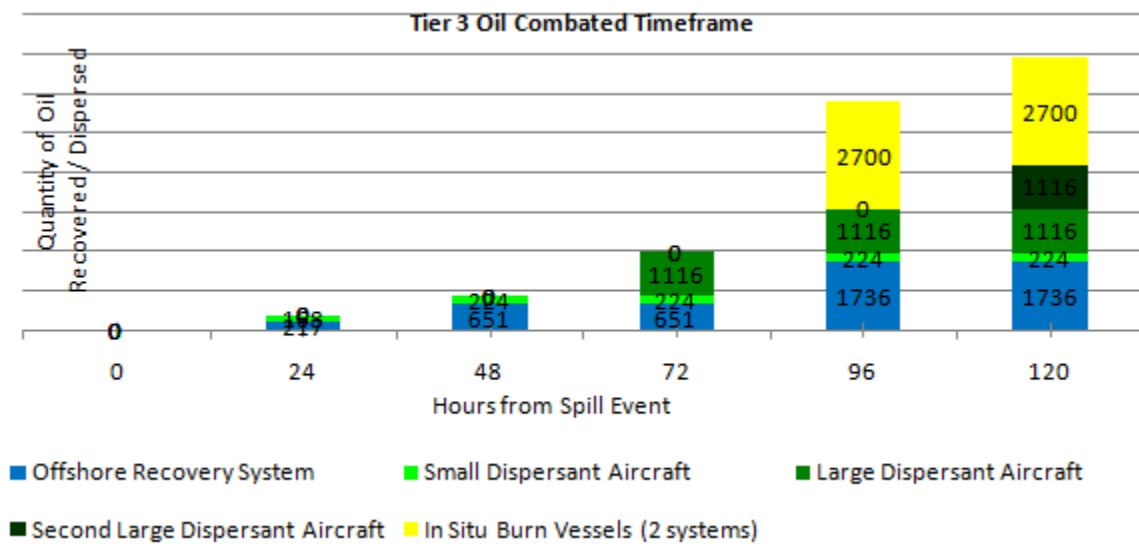


Figure 2 Response options timeframe chart for Tier 3

As a result of this OSRA the following recommendations were made:

- Offshore containment and recovery systems with a combined recovery rated to 300 m³ should be available
- Small scale dispersant aircraft should be made available
- Shoreline equipment recommended as stranding probable
- Investigations as to potential sources of vessels of opportunity should be conducted.

Oil Spill Response Plan (OSRP)

Based on the ERA/OSRA, an OSRP was established before the drilling commenced. The overall objective was to prevent stranding of oil in vulnerable sites and habitats by mobilizing multiple offshore and shoreline response teams. Establishing this OSRP however presented several issues due to Tanzania being a frontier area with regard to offshore oil exploration.

The Tanzanian national authorities are undergoing a process of establishing their first National Marine Oil Spill Response Contingency Plan (NMOSRCP). At the time of writing the OSRP a draft was available although it was not clear whether the draft national plan was going to be accepted. Statoil therefore commenced a complex stakeholder engagement process with both the Competent National Authority (SUMATRA) and the National Environmental Management Council (NEMC). This stakeholder engagement process concluded that sole reliance on mechanical response measures to large offshore spills may result in less effective protection of the environment. Statoil wanted to include chemical dispersion as a response option (from the draft plan it was understood that dispersant use would be a viable response option), however there were no approved dispersants or guidelines for dispersant use in Tanzanian waters.

Statoil approach was to issue a document to national authorities which provides background information on dispersants and suggests types for use and application guidelines. Dispersants are normally approved for use within a country by a regulatory body. This body may conduct tests on the dispersant to determine the effectiveness and toxicity of the dispersant, if the dispersant passes the tests (to the government regulatory body criteria) it is

then placed on an “Approved List”. Tanzania does not have such a testing regime currently in place. Therefore it is suggested that for any dispersant to be used it should be a dispersant approved on a minimum of two of the three major approval lists – UK, USA and France. Based on this Statoil included Dasic NS for chemical dispersion response – storing 60 m3 in Tanzania. A small scale dispersant aircraft was on 24/7 duty, located in Dar es Salam, for rapid response.

There were no identified formal approval processes in Tanzania for oil spill response plans and so Statoil initiated meetings with different authorities located in Dar Es Salaam, Mafia Island and Kilwa to present our preparedness and eventually presenting the final OSRP. During these meetings Statoil agreed on a way to notify the authorities and how they will be integrated/informed in case of an incident.

Mafia Island was identified in the ERA as the most vulnerable area – with high probability of oil reaching shore in case of a larger release and with natural resources exposed. Special attention was therefore given to the shoreline response and wildlife response for the National Park on Mafia. A survey was made of Mafia Island and based on the survey trailerised shoreline packages were installed in the national park to allow for rapid deployment. Statoil are hiring this Tier 2 shoreline equipment package from OSRL. Training and exercise of employees from the national park was conducted and they will be ready for deployment if needed.

Included in the oil spill response plan is identifying the support chain for Tier 3 equipment, from our Tier 3 provider OSRL. Figure 3 below shows the tasks involved in moving equipment from the contractors’ base to the scene of the incident and then to deploy these

resources to mitigate the effects of the incident. This diagram clearly shows the tasks which are the responsibility of OSRL shown in blue and those which are the responsibility of Statoil shown in orange.

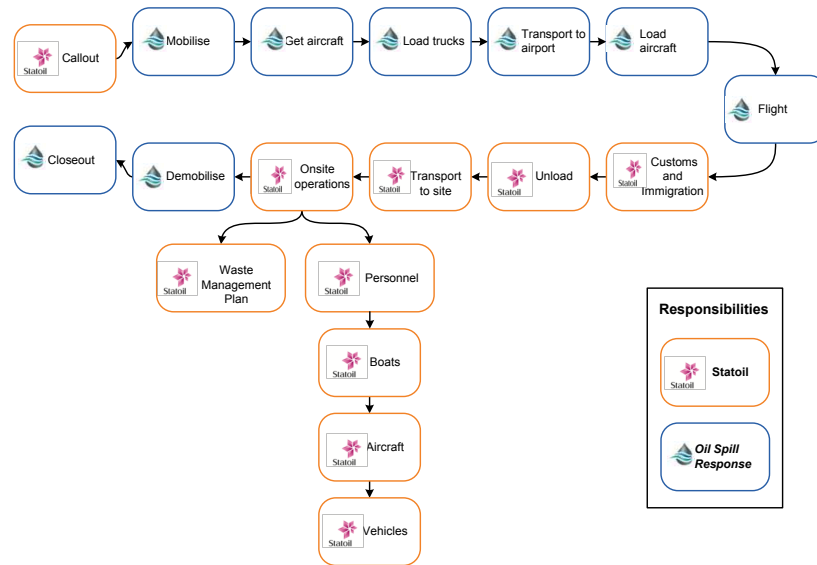


Figure 3 Key Logistics Responsibilities

To be prepared in case of such worst case incidents Statoil has prepared “yellow pages” where different suppliers are mapped and information easy accessible to the oil spill response organization located in Dar es Salaam. In addition a list of vessels of opportunity has been prepared that is regularly updated during the drilling campaign. We have been in contact with the authorities to put forward our need for a rapid procedure at customs in the event of the need for additional OSRL equipment.

For all oil spill incidents, Statoil adopted the Incident Command System (ICS) as the preferred response management system. The Statoil office in Dar es Salaam consists of a minor staff and the oil spill response organization is categorized as a lean organization. Additional resources would have to be implemented from the whole company and other

companies/organizations– resulting in a need to identify personnel through the company that could contribute. Local resources with oil spill response operations could also be a challenge.

Statoil together with our contractors coordinated and devised a series of training courses and exercises (desktop and in-field) designed to meet the needs and requirements of response operations. Examples; Statoil local office, standby vessel, supply vessel, stand-by aircraft , personnel at Mtwara base, personnel at Mafia etc.

Even more challenges have been identified working with planning in a remote area. Going through the process of preparing you come to a point when you need to ask the question: how detailed should we prepare. Typical issues are waste management, transport of equipment, lack of local competence, lack of equipment, involvement of NGOs and wildlife response plan/procedures.

Oil spill preparedness in a remote area is to a large degree having a toolbox with different tools ready in the vicinity, knowing that you have made efforts to ensure an easy custom clearance if needed, involving the authorities as needed, but most of all it is a logistics challenge!