Annex D7

NTS of ERM Oil Spill Report

A non-technical summary of the oil spill modelling report was released with the draft EIA report.

1 NON-TECHNICAL SUMMARY OF OIL SPILL MODELLING REPORT

1.1 BACKGROUND

Eni South Africa BV is planning for Exploration Drilling Programme in Block ER236, offshore of the Kwa-Zulu Natal Coast of South Africa. The wells are located off the east coast of South Africa in the Indian Ocean and, at their closest point approximately 80 km from the coast.

As part of the EIA Process, Eni has conducted an oil spill modelling study to support the assessment of potential environmental impacts resulting from unplanned (accidental and unwanted) releases of hydrocarbons associated with drilling activity and potential vessel collisions.

The modelling evaluates the impacts of three unplanned events in the form of hypothetical oil spill scenarios, which are expected to have a very low probability of occurring. The modelling of the worst-case scenario is in line with best practice and is required for the development of the Emergency Response Plan and Oil Spill Contingency Plan.

1.2 METHODOLOGY

Three spill locations were used originating in Block ER 236 (i.e. N1, N2, and S) as show in *Figure 1.1.*

Scenarios that were evaluated included:

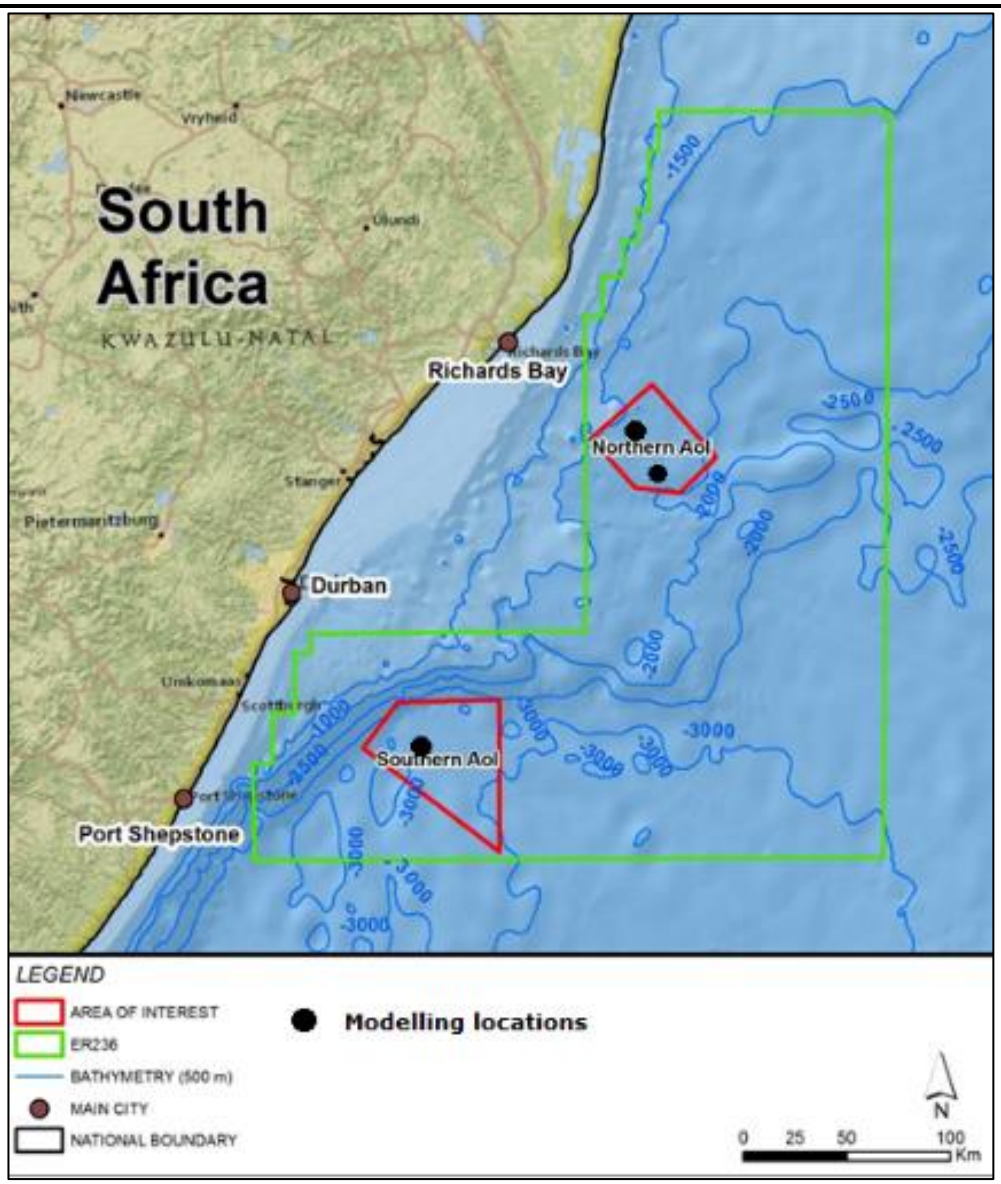
- **Scenario 1** - diesel spill associated with a vessel collision during drilling of a well.
- **Scenario 2** - a deep blowout of crude oil during exploration including the following two cases:
    - *Hole collapse (Scenario 2a)* – the model simulated the continuous loss of crude oil from the reservoir for 7-days. In addition modelling was undertaken for Dissolved Aromatic Hydrocarbon (DAH) concentrations from the blowout.
    - *Cap Install (Scenario 2b)* – the model simulated a release lasting 20 days due to a blowout at the reservoir. On the 20th day, a capping stack is successfully installed and the release is terminated.
- **Scenario 3 -** release of Non-Aqueous Drilling Fluid (NADF) due to the emergency disconnection of the riser.

The evaluation of impacts on surface waters and the shoreline was done using the modelling system (called GEMSS) using hydrodynamic and meteorological data.

The three spill scenarios were modelled in order to simulate; the;

- Spill trajectories;
- Potential locations of the sea surface slicks and their potential to impact wildlife;
- Potential shoreline locations at risk of oiling; and
- Minimum travel time for the slick to arrive at the shoreline

Figure 1.1 Map Showing Spill Modelling Locations in Block ER 236



Source: Oil Spill Modelling Report, 2018

1.3 KEY FINDINGS

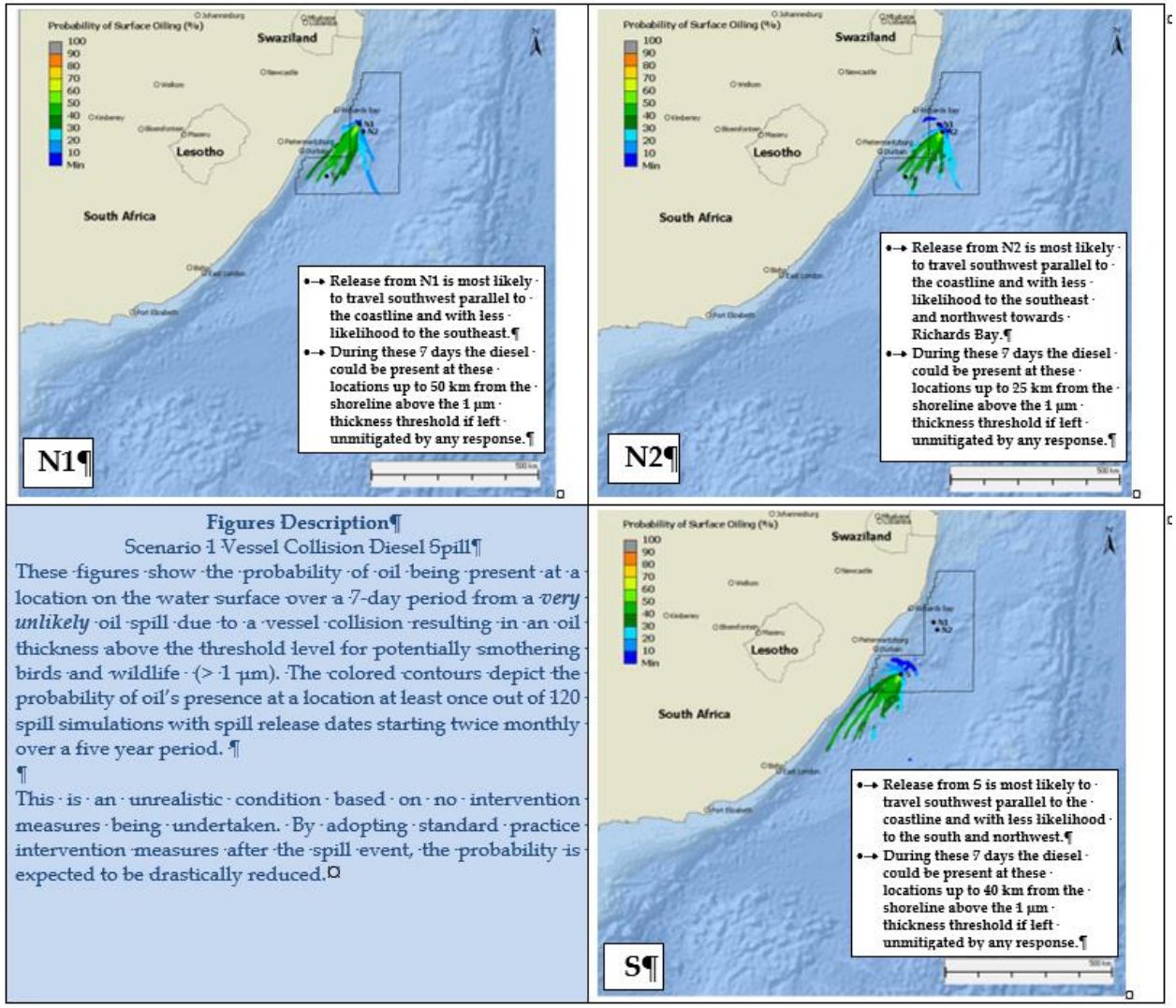
As requested by international practise, the modelling was run 120 times, over a five year period, assuming no response measures and mitigating actions would be available at the point of spillage. This is an unrealistic condition because, in the case of an accidental and unwanted spill, Eni will adopt any measure to close the source of spill, reduce and bound the spill and limit the impact on the environment, including direct and indirect impacts to the sea, the shoreline and species. Therefore, the results present the 'worst case scenario' without any intervention that could result from any particular oil spill.

Scenario 1 - Diesel Spill associated with a vessel collision during drilling:

- A spill of 794.9 m^3 of diesel fuel oil is likely to travel predominantly in the southwest direction parallel to the South African coastline.
- The spilled diesel will evaporate and disperse within two days when the slick will no longer be visible or pose a risk to birds and wildlife.
- The closest the slick will reach a thickness above the minimum threshold (1.0 µm) for risk to birds and wildlife, is 20 km from the coastline.
- The total length of this stretch at risk of oiling above the threshold for significant injury to wildlife (100 g oil/m^2 of shoreline) is up to 366 km and the probability of shoreline oiling at any location is between 3.3% from a release from N2 and 15% for a release from S.
- In either case, the diesel has the potential to reach the shoreline within 4 days without considering any intervention measures by Eni.
- Even if some diesel did reach the shoreline, diesel fuel is not sticky and would not produce viscous like crude oils. Diesel would naturally degrade and evaporate on the shoreline over time.

The following figure depicts the probability of smothering surface oiling (>1.0 µm) for spill at N1, N2 and S after a very unlikely vessel collision event.

Figure 1.2 Scenario 1: Vessel Collision Diesel Spill - Probability of smothering surface oiling (>1.0 µm) for spill at N1, N2 and S



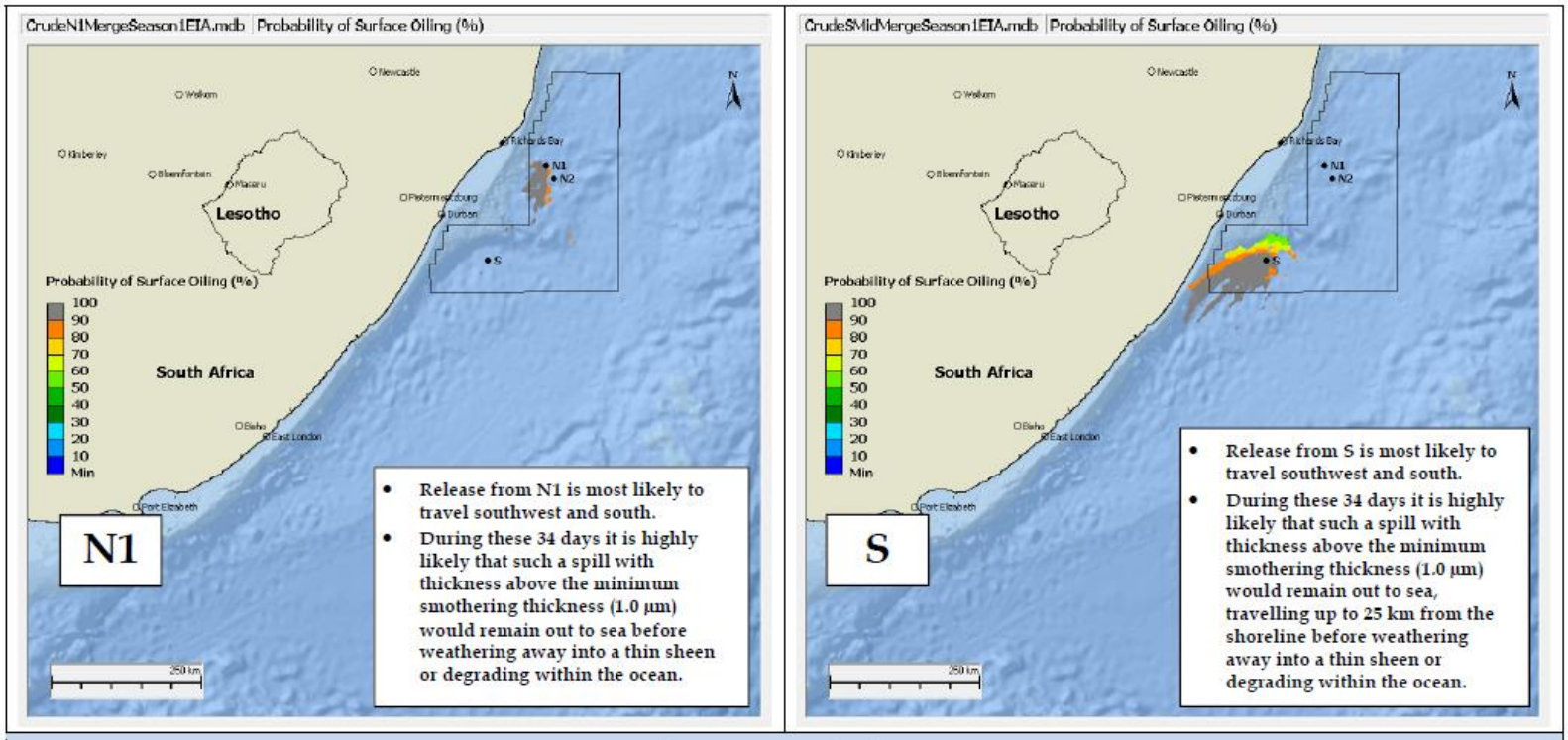
Source: Oil Spill Modelling Report, 2018

Scenario 2 – Blowout of crude oil during exploration drilling:

- Due to the strong influence of Agulhas Currents, in the unlikely event of a blowout occurring, oil slicks would be transported parallel to the South African coastline.
- Though some oil is predicted to contact shorelines within 4 to 7 days, oil slicks thicker than the smothering thickness (1.0 µm) for risks to birds and wildlife would stay off the coastline.
- Much of the oil mass is estimated to be assimilated within the water column, and the volume reaching the surface weathers and disperses during the transport towards the shoreline.
- No shoreline oiling above significant shoreline oiling flux threshold for wildlife injury (>100 g/m² of shoreline) was predicted for either for either Scenario 2a and Scenario 2b.
- Maximum area of DAH above the 5 ppb threshold for worst case oiling ranged from 2,033 km² (southern well location during summer/autumn) to 5,874 km² (northern well location during winter/spring).

Figure 1.3 represents the 20-Day Crude Oil Blowout Probability of smothering surface oiling (>1.0 µm) for spill at N1 and S in Summer/Autumn and *Figure 1.4* for the seasons Winter / Spring.

Figure 1.3 Scenario 2b: 20-Day Crude Oil Blowout –Probability of smothering surface oiling (>1.0 µm) for spill at N1 and S in Summer/Autumn



Figures Description

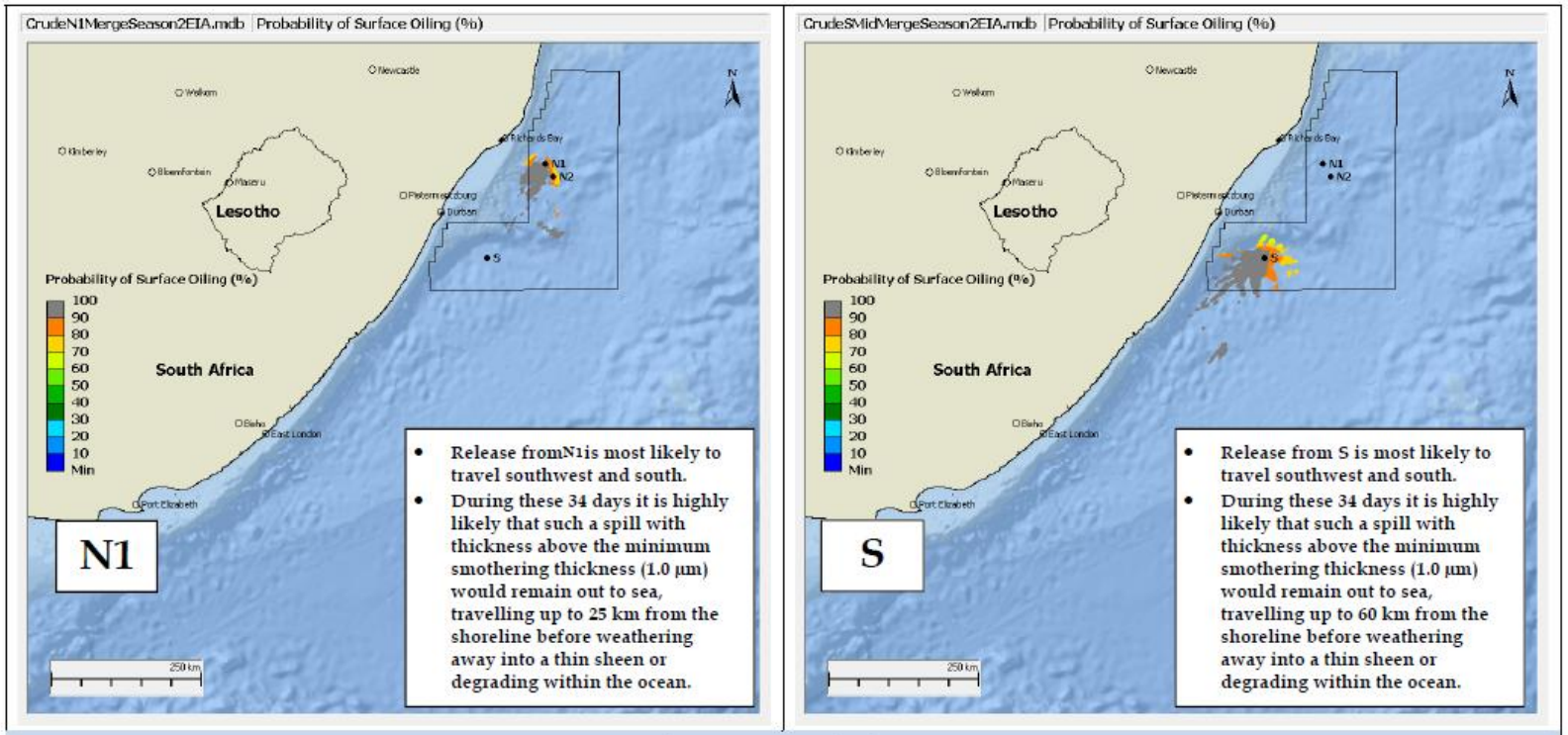
Scenario 2b 20-Day Crude Oil Blowout

These figures show the probability of oil being present from a 20-day blowout at a location on the water surface over a 34-day period from a *very unlikely* oil spill due to a blowout resulting in an oil thickness above the threshold level for potentially smothering birds and wildlife (> 1 µm). The colored contours depict the probability of oil's presence at a location at least once out of 120 spill simulations with spill release dates starting twice monthly over a five year period.

This is an unrealistic condition based on no intervention measures being undertaken. By adopting standard practice intervention measures after the spill event, the probability is expected to be drastically reduced.

Source: Oil Spill Modelling Report, 2018

Figure 1.4 Scenario 2b: 20-Day Crude Oil Blowout – Probability of smothering surface oiling for spill at N1 and S in Winter/Spring



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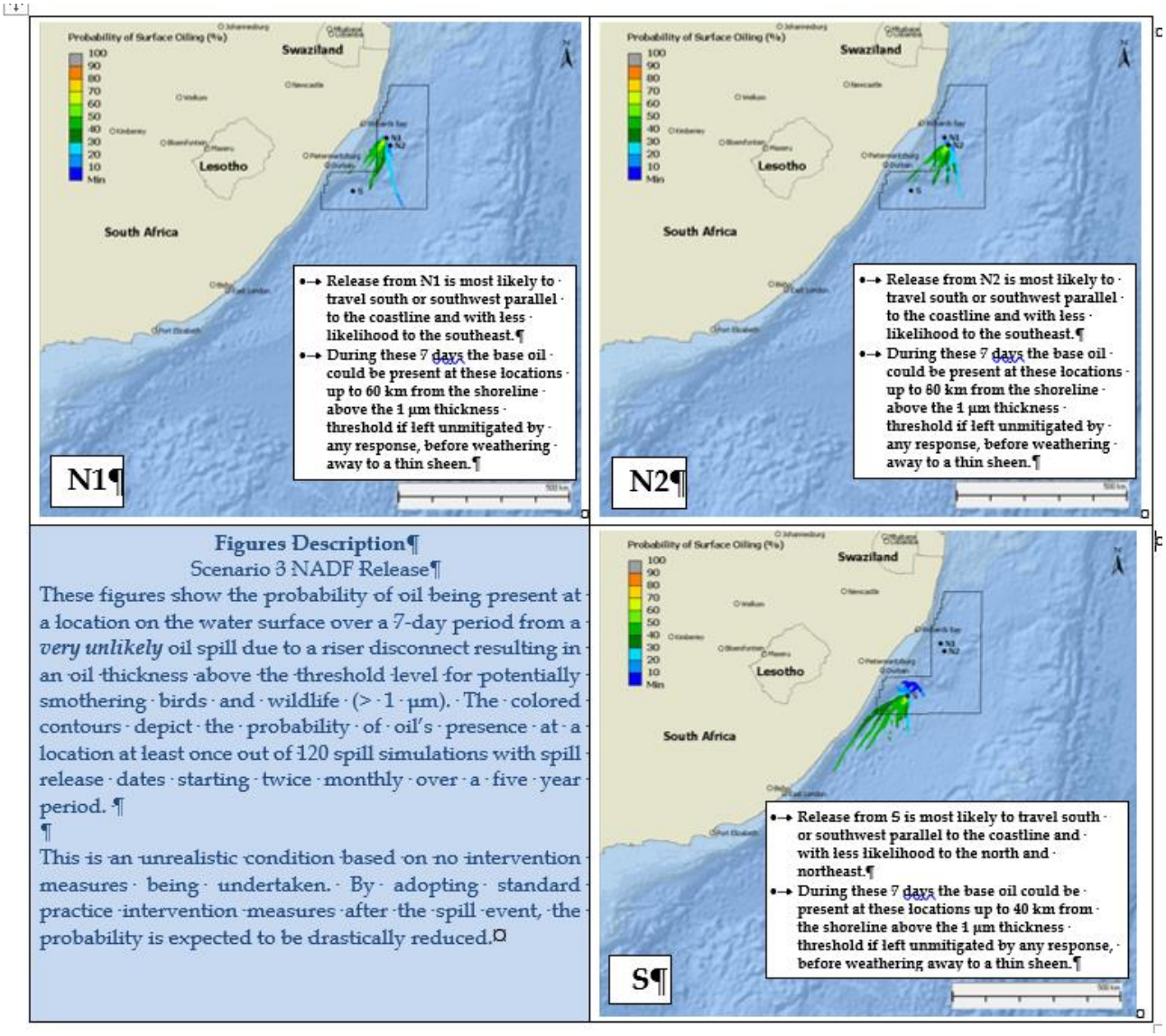
Source: Oil Spill Modelling Report, 2018

Scenario 3 - Release of drilling fluid due to Emergency Riser Disconnect:

- The resulting base oil spill may rise to the surface to form a slick that travels predominantly in the south and southwest directions, while the oily solid particles settle to the seafloor.
- The closest the slick will reach a thickness above the minimum threshold (1.0 µm) for risk to birds and wildlife, is 25 km from the coastline
- There is no shoreline oiling above the threshold for significant injury to wildlife (100 g oil/m² of shoreline).
- The slick will weather and disperse into a thin sheen within 2 days but could potentially reach shorelines within 4 days.
- Overall, the probability of oil contacting any shoreline is, at most, 15%. This could potentially wash up anywhere on the shoreline of approximately 320 km in length, although the oil itself is unlikely to be significant enough to cause toxic effects or physical fouling.
- For the particle deposition modelling, particles are predicted to scatter on the ocean floor beyond a 10 km radius from their release locations.

Figure 1.5 depicts the probability of smothering surface oiling (>1.0 µm) for spill at N1, N2 and S from an accidental NADF Release.

Figure 1.5 Scenario 3: Accidental NADF Release –Probability of Smothering Surface Oiling (>1.0 µm) for Spill at N1, N2 and S



Source: Oil Spill Modelling Report, 2018

In conclusion, the three scenarios described are very unlikely unplanned events and the modelling assumptions do not take into account any mitigation and/or intervention measures which will be adopted promptly in case of an unplanned event.

To prevent an unwanted oil spill from occurring, Eni has defined a number of controls (starting at the well design phase), response strategies, management measures and resources, including tools and training of personnel, to be planned in advance and set in order to firstly prevent or subsequently reduce the severity of potential impacts in the event of an unlikely and accidental spill.

The use of a subsea BOP (Blow Out Preventer), to immediately shut in the well in case of an emergency, is mandatory. In addition, the availability of a capping system can provide a back-up and secondary equipment to be used in case of the unlikely failure of the BOP. A new capping system has been developed after the Macondo incident, in which a similar tool has been used to successfully shut-in the well and contain any further spill. The Capping system represents an effective and responsive piece of safety equipment which can be used in case of an emergency.

All the response procedures will form part of the Oil Spill Contingency Plan (OSCP) which will be developed and approved by the South African Maritime Safety Authority (SAMSA) prior to the commencement of any operations.