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To: [Hornsea Project Three](#)
Subject: Hornsea 3 - Spirit Energy - Responses to ExA Questions of 19.12.18 [BRO-D.FID4510103]
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CONFIDENTIAL MESSAGE - INTENDED RECIPIENT ONLY

Dear Sirs

Our clients' responses to the ExA's Questions of 19.12.18 are attached together with Appendix and covering letter.

Please acknowledge safe receipt.

Yours sincerely

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On behalf of Brodies LLP
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YOUR REF

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BY EMAIL TO: HornseaProjectThree@pins.gsi.gov.uk

15 January 2019

Dear Sirs

**HORNSEA PROJECT THREE OFFSHORE WIND FARM DCO
OUR CLIENTS: SPIRIT ENERGY NORTH SEA LIMITED; SPIRIT ENERGY RESOURCES LIMITED; SPIRIT
ENERGY NEDERLAND B.V.**

We are instructed by our clients Spirit Energy North Sea Limited (UK Company Number: 04594558), Spirit Energy Resources Limited (UK Company Number: 02855151) and Spirit Energy Nederland B.V. (Company Number: 34081068) operating together under the 'Spirit Energy' trading name in respect of the above Project.

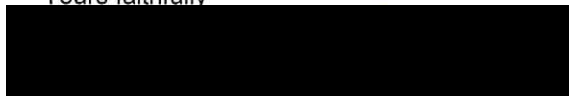
Relevant representations were submitted on behalf of the three Spirit entities in relation to the Project on 20 July 2018. These representations were in near identical terms but three separate representations were submitted in case any differences in terms of the impacts of the Project on each of the three entities became apparent during the Examination process.

A single full written representation and one Post-Issue Specific Hearing 1 submission with appendices were submitted on behalf of the three entities on 7 November 2018 and 14 December 2018 respectively as the impacts of the Project were considered similar across the assets owned and operations undertaken by each of the entities.

For the avoidance of doubt, our clients remain of this opinion and, accordingly, one set of responses to the Examining Authority's questions dated 19 December 2018 has been prepared and is submitted on behalf of all three Spirit Energy Interested Parties.

If you require any further information in relation to this response submitted on behalf of Spirit Energy, please contact Victoria Lane in our Edinburgh office: DDI: 0131 656 0127 or at victoria.lane@brodies.com.

Yours faithfully

A large black rectangular redaction box covering the signature area.

On behalf of Brodies LLP

SPIRIT ENERGY



RESPONSES TO EXAMINING AUTHORITY'S QUESTIONS OF 19TH DECEMBER 2018



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INTRODUCTION

1 Spirit Energy's responses ("the Responses") to the questions issued by the Examining Authority on 19 December 2018 ("the Questions") are set out in the following sections of this document. Certain matters which are common to a number of the Questions are however addressed below.

1.1 Expert evidence

The following experts have contributed to Spirit Energy's answers in so far as these contain technical marine or aviation evidence –

1.1.1 Robert Sinclair, Robert Sinclair Marine Consultants.

Robert Sinclair went to sea as a deck cadet with Shell Tankers in 1973, gaining his Master's Certificate in 1984. Since then he has served on survey vessels, anchor handling vessels and hotel and drilling rigs. Following his seagoing career Robert was a lecturer in nautical studies and Principal of two nautical related colleges. Since 2010 he has been a marine consultant providing support for a range of offshore and renewable energy related projects, specialising in the tow and hook up of floating production units. Robert has authored a range of marine related manuals, including operations and safety manuals, safety cases and rig move procedures. Robert has also served as a non-executive director on the boards and safety committees of two ferry operating companies.

1.1.2 Sujit Viswanathan, Principal Marine Surveyor, Noble Denton Marine Services, DNV GL – Oil and Gas, Region UK and West Africa.

Sujit Viswanathan is an experienced Master Mariner with over twenty years of sea going and shore based experience. Sea going experience includes in a variety of vessels and worldwide navigation primarily with A.P.Moller Maersk. Shore based experience comprises of Marine Superintendence and Operations, and since 2008 he has been engaged in offshore operations for Marine Warranty and Marine Consultancy which includes managing multiple marine projects and services portfolio for clients in the offshore oil and gas industry. He has authored various technical documents relating to marine operations for ship operators, drilling companies and other organizations in the offshore oil and gas sector. He is also experienced in Marine Warranty Surveys the primary role of which is Risk Management of operations to ensure compliance with warranty clauses for underwriters. In addition to being a Master Mariner, he has an honours degree in Physics, a Diploma in Marine Surveys with accreditation in Warranty Surveys, Associate Fellow of the Nautical Institute, Member of the Institute of Chartered Shipbrokers, accredited eCMID and OVID inspector.



1.1.3 Neil Mackay, Senior Aviation Advisor, AviateQ International Limited.

Neil Mackay is a professional helicopter pilot with 36 years' experience working internationally in Australia, Asia, the Middle East, Europe and Africa. For the last 16 years, he has been flying helicopters in support of offshore operations and has been involved in management, pilot training and helideck standards. While now retired as a helicopter pilot, his work in the helicopter aviation sector focuses on project management, auditing aircraft operations, helideck inspections and helideck crew assessments.

1.1.4 Ray Reynolds, Founder Owner & CEO, AviateQ International Limited.

Ray Reynolds has over 40 years' experience in the aviation industry and has flown helicopters offshore in the North Sea in support of the oil and gas industry. Ray has held key safety roles in support of aviation operations covering helicopter and fixed wing activities on an international basis and is recognised in the oil and gas industry as providing sound professional advice. He founded AviateQ International Limited in 2004 – an independent aviation consultancy specialising in Aviation Safety Management Systems, Audit and Advice, Standards and Guidelines in Aviation Operations, Risk Assessments and Accident & Incident Investigation. Ray is an accredited lead auditor.

1.1.5 Max Rowe, Consultant to Spirit Energy

Dr Max Rowe is an experienced oil & gas industry manager with ~30 years' experience with North Sea operators in a variety of roles ranging from technical and operational to QHSE and commercial. He has been involved in the management of offshore fields since 1995 including senior management roles. He has had roles within the companies' emergency response organisations including as Emergency Response Director with overall responsibility for managing the response to any emergency. Dr Rowe has been an advisor to Spirit Energy since 2011.

1.2 **Significance of impact and the EN-3 ALARP Tests for Affects and Risks**

Several of the Questions concern, expressly or by implication, the significance or materiality of impacts of the proposed windfarm on the existing situation of offshore installations. The attribution of a gloss to EN-3, save to the particular terms as required by paragraph 4.2.11 of EN-1, of a threshold of “significance” or of “materiality” is misconceived (if it has been so attributed by the ExA).

Spirit Energy's Post Issue Specific Hearing 1 Submission addresses in detail the relevant legislative framework and policy governing the determination of the Application (Sections 8 and 9).

This includes the policy requirements of Parliament contained within EN-3 (see paragraphs 9.10 to 9.30).

In relation to navigation in itself and without any other consequence, paragraph 2.6.163 of EN-3 states that the IPC [Examining Authority] should expect the applicant to minimise (significant) negative impacts to "as low as reasonably practicable (ALARP)." That is, ALARP is integrated without more to and forms part of an extended EIA procedure. Thereby, for navigation in itself, a significance threshold can be applied. But that is not, and cannot be, replicated for safety in relation to offshore installations.

In relation to the safety of offshore installations, paragraphs 2.6.182 - 2.6.183 adopt a different requirement and approach. Paragraph 2.6.183 of EN-3 states that where a proposed offshore windfarm potentially affects other offshore infrastructure or activity, the IPC [Examining Authority] should expect the applicant "to minimise negative impact and reduce risks to as low as reasonably practicable." The guidance terms establish a low threshold of "potential... affect" and it is in that situation that two requirements arise upon the Applicant: a) to itself minimise negative impacts; b) to itself reduce the risks to as low as reasonably practicable. The term "impacts" is required by paragraph 4.2.11 of EN-1 to be read as "likely significant impacts" and so has a "likely significance" threshold. But, neither "affects" nor "risks" is so subject, and so neither the trigger (of a "potential affect") nor the requirement on the Applicant to reduce the "risk" can be read as excluding risks that do not qualify as "likely significant" affects or risks. Rather, the "as low as reasonably practicable" criterion has both a low trigger (which is here accepted by the Applicant as met by an accepted "potential affect") and a high bar to pass (to "reduce risks *as low as* reasonably practicable") to render the risk arising from the potential affect as acceptable.

Furthermore, paragraph 2.6.185 itself attributes to the likely "affect" of a proposal on "safety" the status of an "adverse effect". Such an adverse "effect" is required by EN-1 paragraph 4.2.11 to be read as "likely significant adverse effect", and it is on that basis that paragraph 2.6.185 then attributes "substantial weight" to such an effect against consent for the proposal. Such is the high degree of weight attributed that paragraph 2.6.186 confirms that it is only with careful design, and with necessary consultation, that effects can be reduced "to enable" a grant of consent. This heightened threshold concerning safety is reiterated in paragraph 2.6.184 where "unacceptable risks" result in a requirement to refuse consent. "Risks" cannot be watered down by a "likely significance" criteria and paragraph 4.2.11 of EN-1 cannot apply to "risks" either.

In circumstances where the *Rochdale* approach is relied upon, careful design can only extend to broad volumetric parameters being applied to the proposed array area by which to address the first criteria of paragraph 2.6.186 and so enable satisfaction of the ExA (and the SoS). The second criteria for consultation cannot be satisfied because the CAA has not been consulted on any changes to the operational procedures for the relevant helicopters that it authorises and neither has the MCA about prohibitions on entering the array on safety grounds.

In relation to the CAA¹, as it states in CAP 764 at paragraph 1.4, bullet 1: “The CAA policy on wind energy is that: 1. ... Wind turbine developments and aviation need to co-exist in order for the UK to achieve its binding European target to achieve a 15% renewable energy commitment by 2020, and enhance energy security, whilst meeting national and international transport policies. *However, safety in the air is paramount and will not be compromised...*” .

The CAA is required to authorise changes to operational procedures by service providers (see paragraph 1.22(4) of CAP 764) and early engagement with the CAA by developers is encouraged by paragraph 4.25 and where impasse is reached and objective safety advice is necessary.

The MCA is required to authorise declarations that the whole of an array area cannot be entered on safety grounds, see paragraph 4.3 of MGN 372.

As discussed at paragraphs 9.19 to 9.22 of Spirit Energy's Post Issue Specific Hearing 1 Submission, the ALARP policy requirement is different in these two contexts (navigation; safety). Specifically the requirement set out at paragraph 2.6.183 has a lower threshold, and applies whether or not the potential “risk” is likely to be significant.

Accordingly, the two EN-3 paragraph 2.6.185 safety concerns which are the subject of Spirit Energy's Written Representation namely:

- a) the risk of vessel allision with Spirit Energy's assets, and;
- b) the risk to the present availability of opportunity to access and depart from Spirit Energy's assets by helicopter;

require to be reduced to ALARP *by the Applicant* (not by Spirit) pursuant to its obligation in paragraph 2.6.183 of EN-3². This policy requirement recognises the potentially catastrophic consequences (loss of life) of incidents in an oil and gas environment and aligns with the CAA policy under paragraphs 1.4(1).

¹ CAP 764, paragraph 1.23 states: “In discharging its role as an independent regulator, the CAA is required to provide advice to Government as required. To this end, the CAA is proactive with appropriate Government departments in respect of wind energy related issues. The CAA is a member of the DECC (Department of Energy and Climate Change) Aviation Management Board and its sub-groups to provide expert input on aviation aspects of the Government's renewable energy programme...” .

² Spirit Energy notes that in DCO Reference EN010033-000522-7.2.9, “Hornsea Offshore Wind Farm Project One”, ES Volume 2 – Offshore, Chapter 9, Aviation, PINS Document Reference: 7.2.9 (July 2013), the applicant erred in not applying EN-3, nor paragraphs 2.6.182-2.6.186 in relation to its consideration of risks to the safe operation of offshore installations. The phrase “ALARP” appears alone on Table 9.2 and under EN-1 where Military Aviation is addressed. Whilst EN-3 is mentioned at paragraph 9.3.1 but consideration of the “risk” to offshore installations safety on an ALARP basis is absent. Rather, it is assessed on an EIA basis and excluded.

1.3 **Protective provisions (requirements)**

As set out in Spirit Energy's Written Representation, Spirit Energy do not oppose the principle of the proposed windfarm, but have sought to develop a set of proposed protective provisions which address the provisions of EN-3, paragraphs 2.6.186 and 184-185, and are reasonable and pragmatic in the absence of reduction to ALARP by the Applicant of the accepted potential affects and risks to safety of Spirit's offshore infrastructure, and allow the appropriate successful co-existence of the proposed windfarm (if approved) and its own existing operations in line with EN-3, paragraph 2.6.181.

In light of ongoing discussions between the parties, and in the continued spirit of collaboration and co-existence, Spirit Energy is in the process of further refining its proposed provisions with a view to minimising relevant restrictions on the proposed windfarm in so far as possible, whilst retaining necessary protections for its own assets and operation. A revised set of proposed protective provisions will be lodged in due course.

The approach adopted recognises the detailed design flexibility which is available to the Applicant at this stage – specifically, the turbine model, height, specification and location has not been finalised and admit of lower height turbines in closer proximity to Spirit offshore infrastructure and assets.

Accordingly, the proposed " exclusion zone" (aviation and marine) enables the Applicant to secure successful co-existence of its proposed array by opting to develop a smaller turbine at the eastern edge of the array, this being an option which the Applicant has tabled within the Environmental Statement and ensuring no risk of allision. This also represents a reasonable and pragmatic solution to the potential conflict of interests arising from the Applicant's proposal whilst at the same time being aligned to EN-3 paragraph 2.6.181 so as to enable successful co-existence of sea users. It is also consistent with paragraph 2.6.184 of EN-3 which expects disruption, economic loss and adverse effects on safety to be avoided through "site selection and design" of the proposed windfarm, and illustrates the principle of co-existence – in other words the burden of adapting to the post-development environment should not fall wholly on existing oil and gas operators. Design mitigation should be considered as a primary measure. That is, the absence of agreement by the Applicant to the provision of the foregoing exclusion zone would run contrary to the requirement on it in paragraph 2.6.184 to "avoid or minimise" disruption or "any adverse effect on safety" to (here) Spirit's infrastructure and assets.

1.4 **Absence of protective provisions**

If the Application were to be granted without any of the alternative provisions discussed above, the consequences for Spirit Energy would be very significant. It is reasonably estimated that the resultant flight restrictions (see answer to Question 2.5.16) would lead to a several-fold increase in production downtime. This would result in a situation being contrary to policy EN-3, paragraph

2.6.185, and would prejudice Spirit Energy's ability to meet its obligations under the MER UK Strategy, Central Obligation (see ISH 1 Submission – Appendix O) to, amongst other things, secure that the maximum value of economically recoverable petroleum is recovered, as discussed at paragraphs 4.4 – 4.8 of Spirit Energy's Post Issue Specific Hearing 1 Submission. These would result in a breach of EN-3, paragraph 2.6.181 because the solution to successful coexistence will not have been ensured but instead avoided.

EXAMINING AUTHORITY'S QUESTION 2.5.8:

At ISH1 you expressed a concern that shipping movements in the vicinity of your installations may be increased by vessels on broadly north/south passages diverting around the northern and eastern side of the array in order to join the traffic separation scheme. The baseline shipping routes are shown in figure 3.3 of the Applicants Appendix 13 (to Deadline 1 submissions) Racon and AIS Review J6A Platform Technical Note [REP1-177]. Having regard to that plan it is not clear why such vessels would not pass to the west of the array, in the lane between Hornsea Project Two (not shown on that figure) and Hornsea Project Three. Your Deadline 3 submission [REP3-060] states that ships may divert to the east of the array during a westerly gale.

Is your concern on this matter specific to periods of westerly gales?

In conditions where there is not a westerly gale, what is your evidence that significant numbers of north/southbound vessels would divert around the eastern side of the array?

Please provide illustrative vessel tracks to demonstrate how/why shipping would take the route you suggest.

SPIRIT ENERGY'S RESPONSE TO QUESTION 2.5.8:

The situation summarised by the ExA is not limited to periods of westerly gales (namely Force 8 on the Beaufort Scale or 17 to 21 metres per second) - see Figure 1 below.

Whenever the wind is from the west, vessels may prefer to follow this track to avoid the risk of drifting into the array (e.g. should they experience a loss of power).

Passing through the channel would involve running along a long line of turbines (approx. 20 miles) immediately to the east on to which they would be set by the prevailing wind.

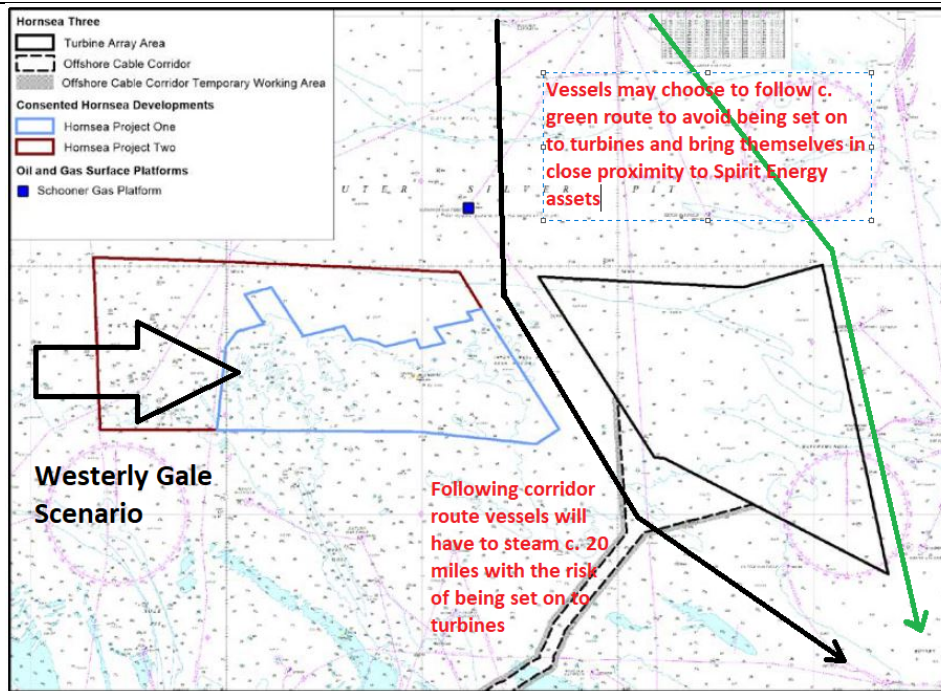


Figure 1 – Showing possible routes that can be taken by vessels in a westerly gale

A vessel passing through the gap in the array, and thence to the TSS 'Off Botney' would have to steam for over 20 miles with the turbines effectively being a lee shore on to which they could be set, the situation being exacerbated in the event of breakdown, hence the imperative to use the route to the east of the array. This would also apply to north bound vessels however these have been omitted for the sake of clarity.

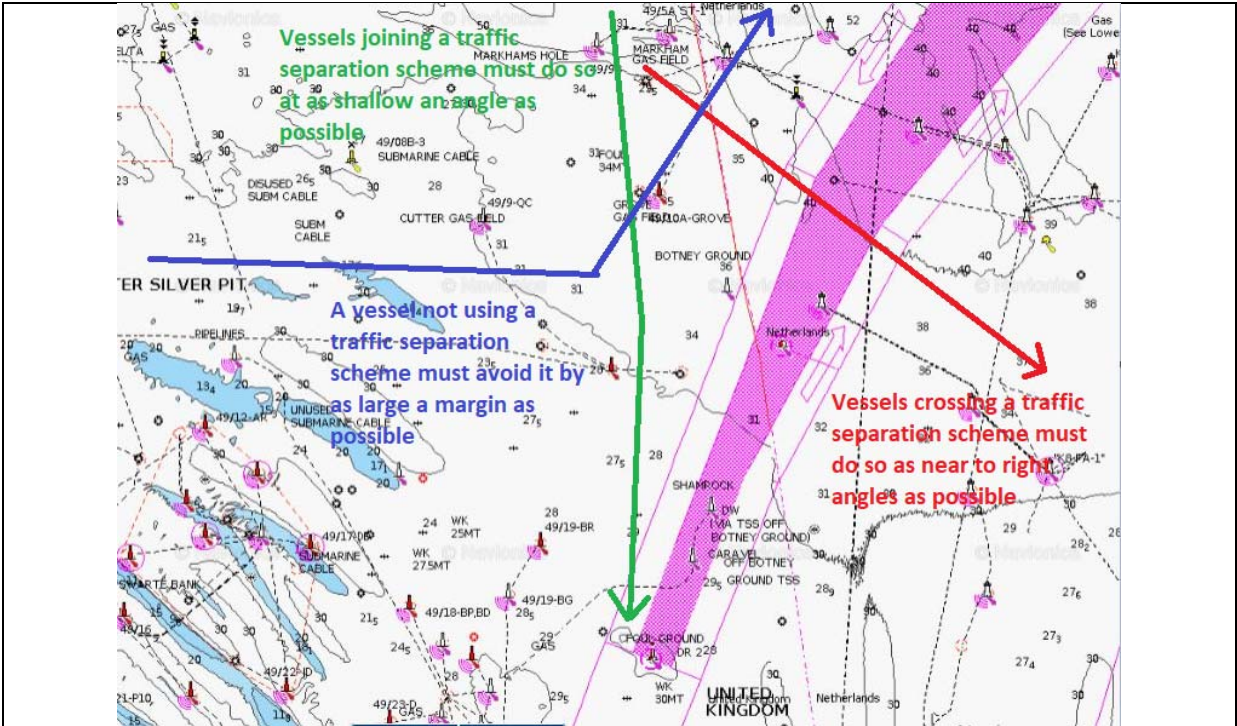


Figure 2: Illustration to show requirements for vessels in relation to Traffic Separation Schemes: International Regulations for Prevention of Collisions at Sea

Figure 2 illustrates how vessels routing to the east of the Array (as shown by the green arrow in Figure 1) may interface with the Traffic Separation Scheme "Off Botney". For example, vessels heading to Antwerp may join the Traffic Separation Scheme at an appropriate angle (green arrow, Figure 2) while vessels crossing the Traffic Separation Scheme may do so along the route indicated by the red arrow on Figure 2.

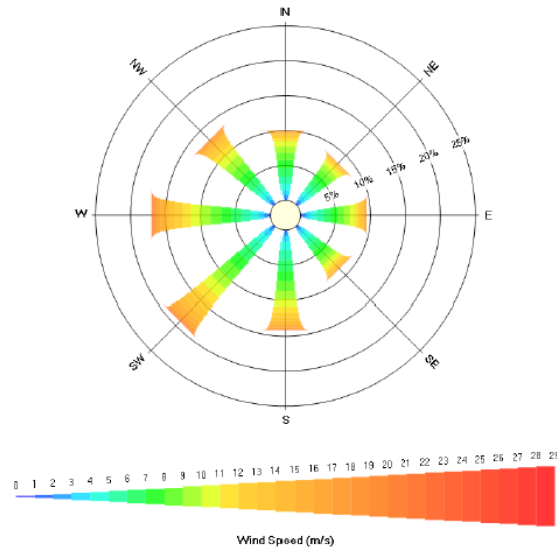


Table 3.7 – Wind Speed Table and Rose – Annual
Relative to True North

Figure 4: Annual Wind Rose extract from metocean data for the area[to be revised]

Figure 4 is extracted from the Block 6a of the Metocean Data (relied upon by DNV GL having been provided by Spirit Energy. The data was prepared on Spirit Energy's behalf). It summarises wind speeds and directions on an annual basis. It can be seen from the diagram in Figure 4 that the predominant wind directions are from the west and south west (from which the wind blows approximately one third of the time, which is significant) giving rise to the conditions where vessels passing between the arrays may be set down onto the Hornsea 3 array and may then choose to pass to the east of the array. However, Figure 4 does include considerable seasonal variation as discussed in the Response to Question 2.5.9 below.

Prudent Masters will select an optimum course based on a number of factors, specifically adapted for the environmental conditions expected at the time of transit. Generally the Master will seek the most economically advantageous route, which can be safely navigated. Factors considered will include:

- Distance;
- Speed expected to be achieved;
- Proximity to navigational hazards, dependent on environmental conditions expected;
- Depths of water available compared with vessel draft (i.e. depth of keel below water line);
- Proximity to, and the rules governing the use of, traffic separation schemes;
- Weather including wind direction and speed, sea and swell directions and heights, visibility expected;
- Tidal stream direction and speed;
- Current direction and speed;
- Traffic density expected, including likely proximity to fishing vessels.

A full list of factors can be found in IMO and MCA guidelines for passage planning. (Ref IMO Res 893(21), MGN 166)

Given the range of factors which may influence choice of route, it is considered possible that masters of vessels may choose to follow the track shown by the green arrow in Figure 1 at any time. The information currently made available by the Applicant on displacement is not considered sufficiently robust to rule this out.

Spirit Energy has not claimed that significant numbers of north/southbound vessels would pass east of the array, other than in westerly gales. However, to date, the Applicant has not provided details of expected traffic in the vicinity of Spirit Energy installations other than claiming that it will be reduced. No detailed evidence has been provided on the level of traffic expected in the vicinity of the installations. The Applicant's marine advisors, Anatec, have agreed to meet with Spirit Energy's marine advisors, DNV GL, to review the modelling undertaken by Anatec. This meeting is scheduled to take place after Deadline 4 and Spirit Energy may have further comments after this meeting has taken place. At the present time Spirit Energy is of the view that Anatec's predictions are primarily the result of input assumptions rather than providing an evidential basis for future traffic movement.

As is set out in the Introduction of this document, national policy EN-3, paragraph 2.6.183 and 2.6.184, require that the risk of allision by commercial vessels with Spirit Energy's assets (here, the NUIs Chiswick and Grove and in due course C6) is reduced by the Applicant to ALARP.

“Risk” is the chance, high or low, that somebody could be harmed by these and other hazards, together with an indication of how serious the harm could be³. The catastrophic consequences of such allision (see Table 4.1 in DNV GL Report – Document 16, Full Written Representation) are such that even low probability scenarios should be the subject of mitigation because the consequence remains catastrophic and there is no robust evidence to show that fewer vessels are likely to pass close to the infrastructure with the Array than without it. The identified risk should be reduced to ALARP whether or not significant numbers of vessels are likely to take this route. The prospect of even relatively low numbers of vessels routing to the east of the proposed windfarm, where such a situation is not currently present, generates a risk to safe operation of the existing infrastructure from allision in the sense that such vessel routing cannot be excluded and so the risk is changed and remains.

³ HSE definition of risk.

EXAMINING AUTHORITY'S QUESTION 2.5.9:

At ISH1 you expressed a concern that shipping movements in the vicinity of your installations may be increased by ferry traffic diverting around the south eastern corner of the array then altering course to the north east in order to cross the traffic separation scheme at an appropriate angle.

This would appear to be a longer and more complex route that diverting to the north of the array as predicted in figure 3.4 of the Applicants Appendix 13 (to Deadline 1 submissions) Racon and AIS Review J6A Platform Technical Note [REP1-177]. Your Deadline 3 submission [REP3-060] refers to potential diversions to the south during a northerly gale.

Is your concern on this matter specific to periods of northerly gales?

In conditions where there is not a northerly gale, what is your evidence that significant numbers of eastbound ferries would divert around the south eastern corner of the array and, having done so, alter course towards your installations?

Please provide illustrative vessel tracks to demonstrate how/why ferries would take the route you suggest.

SPIRIT ENERGY'S RESPONSE TO QUESTION 2.5.9:

The situation is not limited to periods of northerly gales (namely Force 8 on the Beaufort Scale or 17 to 21 metres per second) – see Figure 5.

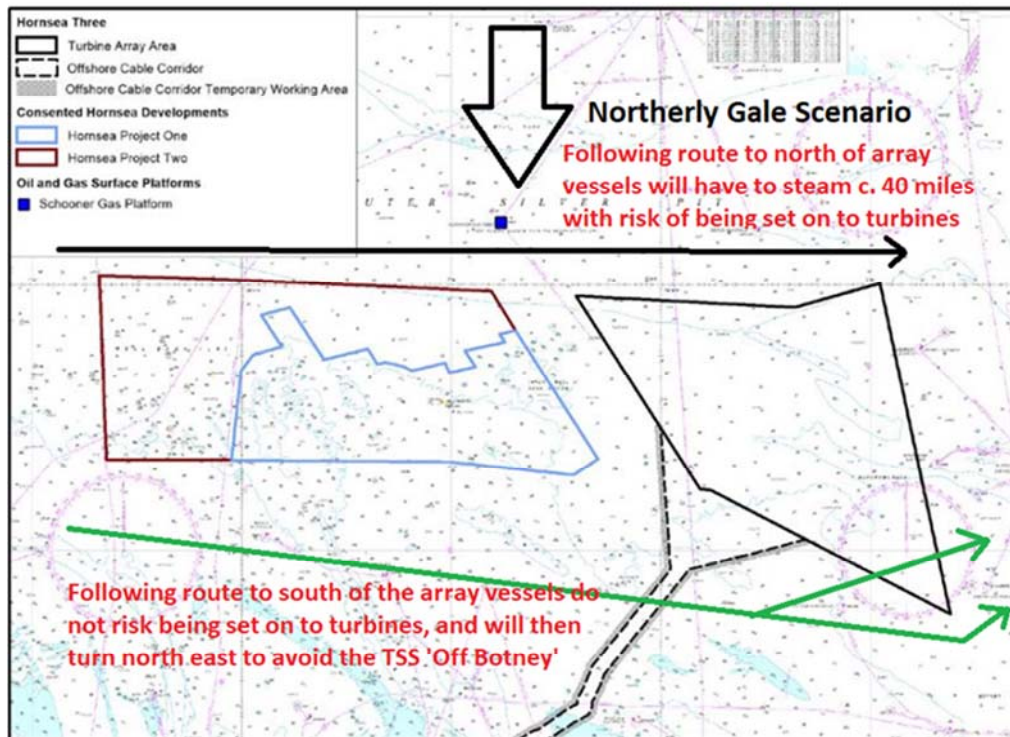


Figure 5: Illustration to show possible vessel tracks during Northerly Gales

Whenever there are northerly winds, vessels passing to the north of the array would be at risk of drifting into the array. By passing south of the array, vessels would avoid running along a long barrier of turbines (c. 40 miles) on to which they would be set by the prevailing wind. The two green arrows on Figure 3 illustrate routes which masters might reasonably take to avoid the Traffic Separation Scheme – in both instances bringing the vessel in close proximity to Grove. This situation would be exacerbated in the event of a loss of power.

Given the range of factors which may influence the choice of route set out in answer to Question 2.5.8, it is considered possible that masters of vessels may choose to follow this route in other conditions at any time.

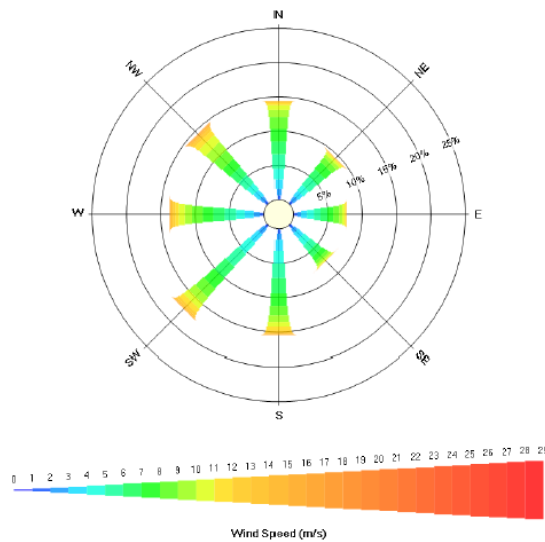


Table 3.13 – Wind Speed Table and Rose – June
Relative to True North

Figure 5A: Seasonal wind rose extract for the area for June

Despite the predominant winds being from the west/south west, the wind rose depicted at Figure 5A illustrates the seasonal variations which can and do occur, with northerly winds being more frequent than usual in June (approximately 15 per cent of that month). This frequency is considered important. However, it should be noted that these presentations are long term averages and that periods of exceedance can occur at any time, from any direction.

Spirit Energy have not claimed that significant numbers of eastbound vessels would pass around the south eastern corner of the array, other than in northerly gales. However, to date, the Applicant has not provided

details of expected traffic in the vicinity of Spirit Energy installations other than claiming it will be reduced. No detailed evidence has been provided on the level of traffic expected in the vicinity of the installations. The Applicant's marine advisors, Anatec, have agreed to meet with Spirit Energy's marine advisors, DNV, to review the modelling undertaken by Anatec. This meeting is scheduled to take place after Deadline 4 and Spirit Energy may have further comments after this meeting has taken place. At the present time Spirit Energy is of the view that Anatec's predictions are primarily the result of input assumptions rather than providing an evidential basis for future traffic movement.

As is set out in the Introduction of this document, national policy EN-3 requires that the Applicant reduce the risk of allision by commercial vessels with Spirit Energy's assets (the NUIs Chiswick and Grove and its assets) to ALARP.

The catastrophic consequences of such allision (see Table 4.1 in DNV GI Report, Document 16, Full Written Representation) are such that even low probability scenarios should be the subject of mitigation. The identified risk should be reduced to ALARP whether or not significant numbers of vessels are likely to take this route. The prospect of even relatively low numbers of vessels routing to the south of the proposed windfarm is material in the context of this Application and its determination.

EXAMINING AUTHORITY'S QUESTION 2.5.10:

At ISH1 the Applicant referred to 10 years of traffic surveys which indicated that commercial ships do not generally pass through OWF arrays. Spirit Energy has pointed out that MCA advice does not preclude vessels from navigating through OWF arrays and that this may become more common in future [REP1-102].

Please can the Applicant provide further detail as to when and where these surveys were carried out and what the results were?

Does Spirit Energy have any evidential basis for the suggestion that commercial ships (other than fishing vessels) would pass through the array?

SPIRIT ENERGY'S RESPONSE TO QUESTION 2.5.10:

MGN 372 clearly indicates that passing through a wind farm, with caution, is one of three options open to mariners when planning a passage (see Figure 7 below, extract from MGN372).

4.8 Options

- 4.8.1 In taking account of this guidance there are, in simple terms, three options for mariners:
- (a) Avoid the OREI area completely,
 - (b) Navigate around the edge of the OREI, or
 - (c) In the case of a wind farm, navigate, with caution, through the wind farm array.
- 4.8.2 The choice will be influenced by a number of factors including the vessel's characteristics (type, tonnage, draught, manoeuvrability etc), the weather and sea conditions,
- 4.8.3 Mariners should be aware that radar targets may be obscured when close to a wind turbine field.
- 4.8.4 These notes do not provide guidance on a safe distance at which to pass an OREI, as this depends upon individual vessels and conditions. However where there is sufficient sea room it is prudent to avoid the area completely (option (a) above).
- 4.8.5 In some sea areas, additional information may be promulgated by Vessel Traffic Services.

Figure 6: Extract from MGN 372

Passage through windfarms is currently undertaken by fishing vessels and wind farm related vessels.

To date, many of the wind farms in operation are of a small scale when compared to the combined effect of the Hornsea 3 development (as illustrated by Figure 2.2 in the ES Volume 4, Annex 5.3 – Location of Cumulative Projects, Plans and Activities). Consequently, diversions around the current wind farms may not add a substantial penalty in terms of distance and hence time for commercial vessels. Accordingly, vessel tracks in the vicinity of existing windfarms are not reliable evidence as a predictor of tracks that will be followed by vessels affected by the Project. Whilst it is accepted that array transits may not currently be common practice in the UK sector, as the area of sea subsumed into windfarms increases there is an increasing likelihood that vessels will adopt this practice, especially as it is promoted as one of three options for vessels by the Marine Coastguard Agency (MCA). Smaller, short sea, vessels are already well used to navigating inland channels and canals and already cross the southern north-sea in considerable numbers between the UK and the near continental ports. It is considered that the list of factors (see answer to Question 2.5.8) likely to influence masters of vessels when choosing the most appropriate route would also influence the decision of a master to transit through an array or not.

Whilst it is accepted that in future, the largest vessels may not choose to transit wind farm arrays, and that fishing vessels will transit arrays, it is highly likely that a range of intermediate vessels may opt to do so, as outlined in MGN372 and as they remain entitled to do so.

The southern North Sea, and associated ports and river systems, are served by large numbers of such

intermediate vessels, mainly coastal trading vessels. Many of these vessels are owned by single vessel companies or family concerns, akin to the structure of the fishing industry. These vessels trade extensively between east coast UK ports and continental ports (to their east) carrying a range of cargoes including bulk cargoes (grain, coal and ore) containers, general cargo and hydrocarbon products.

By way of example, at 10.12 am on 11th January, a vessel of this type passed through the area in which the array will be situated. Photographs of the vessel are shown below in Figure 7. At that time, there were three similar vessels in the area – two east bound and one west bound (Source: Marinetraffic.com).



Figure 7: Typical type of vessel is shown above entering the Cromarty Firth (l) and at Kings Lynn (r)

This vessel is a bulk carrier and was on a voyage between the Humber (Goole) and Delfzijl in Holland. The vessel has a retractable bridge to enable passage through the European and UK river systems and a brief analysis of previous ports shows that it trades extensively between the UK and European ports. Such vessels are well used to navigating in close proximity to navigational hazards and may well opt to pass through arrays as the area subsumed by windfarms increases. The vessel has a deadweight in excess of 3000te and was steaming in excess of 10 knots at the time of observation.

There is no prohibition on such a vessel routing through the proposed array, nor routing between the south-east corner of that array and the TSS “Off-Botney”.

If such a vessel collided with a gas platform the impact energy would be around 50 mega joules, the limit at which total collapse of the platform could be expected, with concomitant catastrophic consequences (see Table 4.1 in DNV GL Report, Document 16, Full Written Representation). That risk is neither excluded nor reduced to ALARP by the Applicant.

EXAMINING AUTHORITY’S QUESTION 2.5.11:

At ISH1 Spirit Energy accepted that an estimated speed of 4 knots for a drifting vessel (not under command) would be an extreme situation. The Applicant’s Deadline 3 submission [REP3-003] stated that

the drift time from the eastern edge of the array to the nearest platforms would be 30 minutes to 2 hours. Spirit Energy's Deadline 3 submission [REP3-060] gave an example of a vessel drifting at 9 knots (albeit in a location where tidal conditions may be different).

Specifically in relation to windfarm support vessels, what would be the likely speed of a drifting vessel driven by wind and tide?

Specifically in relation to a construction barge, which may be loaded with large WTG components, what would be the likely speed of a drifting vessel driven by wind and tide?

How long would it take for such vessels to drift from the eastern edge of the array to the Chiswick or Grove Platforms?

SPIRIT ENERGY'S RESPONSE TO QUESTION 2.5.11:

Windfarm Support Vessels

It is difficult to generalise as windfarm related vessels are many and varied. In the case of jack up crane vessels, if disabled with legs extended in the air, the considerable windage (air resistance of moving vessel) could lead to wind driven speeds of three to four knots. However, the calculation of drift speeds is not an exact science and, as the example of Saga Sky in the recent MAIB Report shows (MAIB Report No 03/2018 of March 2018 – ISH1 Submission, Appendix U), even setting anchors and colliding with an anchored barge did not stop the drift until after the combined vessel/barge had severed the main electricity interconnector.

Construction Barges

In such a situation, with a dumb (i.e. not powered) barge being towed by a tug, with the tow line parting the drift, speed will depend on the barge draft (i.e. the depth of the barge's keel below the water line), current, windage (i.e. air resistance of moving vessel) and wind speed. The relatively shallow drafts of such barges means that they will be under greater influence of the prevailing wind than tide. In effect, transition pieces (i.e. the top part of the foundation), turbine towers carried vertically, or tripod foundations will act like a sail, increasing the speed. Bearing in mind the speeds attained by Saga Sky in the recent MAIB report, 4 knots is not unreasonable and speeds well in excess of this are certainly possible.



Figure 8: Wind farm components (tripod foundations) on a barge, considerably increasing windage of the vessel

The risk posed by a drifting construction barge would be worse in winds from the south west / west i.e. the predominant wind directions, as illustrated by Figure 4 – wind blows from the west/south west approximately one third of the time. In such circumstances, at around four knots drift speed, a drifting barge would drift to Chiswick and or Grove in between thirty to forty minutes. No tide has been allowed for. Where the tide is working with (rather than against) the drifting barge, the effect of the tide may be to add another 1 to 2 knots to the speed of the drifting barge.

EXAMINING AUTHORITY'S QUESTION 2.5.14:

The ES [APP-068] states that helicopter flights are conducted using instrument approaches to oil and gas platforms 5% of the time. Spirit Energy's Deadline 3 submission [REP3-069] states that instrument approaches would be required on 88 days per year.

Please can the Applicant explain the basis for the figure of 5% in the ES?

Please can the Applicant and Spirit Energy explain why their respective assessments differ so significantly?

Please can Spirit Energy confirm whether Chiswick and Grove platforms have any restrictions in terms of instrument approaches at present?

SPIRIT ENERGY'S RESPONSE TO QUESTION 2.5.14:

In Spirit Energy's Deadline 3 analysis of actual meteorological data, 88 days per year (equivalent to 24%) were expected to be in Instrument meteorological conditions ("IMC"). This analysis was based on a pilot's review of the weather forecasts at J6-A on each day.

Spirit Energy also undertook an analysis of a dataset made up of metocean data at the location of J6-A (near to Chiswick and Grove NUIs) comprising data for every 3 hours (see ISH 1 Submission, Appendix ZN). In this analysis it was assumed that IMC would apply whenever the cloud base is <1000' or visibility is <5km. This analysis concluded that IMC conditions would apply 31% of the time.

Further discussions with the Applicant revealed that the Applicant's contention that IMC apply 5% of the time is based on the anecdotal evidence from an informal discussion with a single pilot and not on metocean data. The Applicant also performed an analysis of their dataset for a different location (Schooner) to the west of the Chiswick NUI. In that analysis the Applicant assumed that IMC would apply whenever cloud base is <600' or visibility is <4km. This analysis generated the result that IMC conditions occur 15% of the time at that location.

A review of the CAA authorised operating procedures of North Sea helicopter operators shows a difference in the day VFR visibility criteria as shown in Table 1, below. Also included in the table are the International Association of Oil and Gas Producers ("IOGP") minima to which helicopter operators servicing oil and gas operators operate also unless the helicopter operator minima is more restrictive as is the case for the night cloud base. Based on Table 1 below, Spirit Energy and the Applicant should both have assumed that, during daylight hours, IMC would occur whenever cloud base is <600' or visibility is <5.55km and outside of daylight hours (from half an hour after sunset to half an hour before sunrise IMC would occur whenever cloud base is <1200' or visibility is <5.55km). Spirit Energy have re-run their analysis on this basis and conclude that IMC apply 30% of the time.

Table 1: Comparison of VFR Limits for Day and Night Helicopter Offshore Flight Operations				
Company	Day Cloud Base	Day VFR Visibility	Night Cloud Base	Night VFR Visibility
IOGP	600 ft	5.55km (3nm)	1200 ft	5.55km (3nm)
NS Operator 1	600 ft	4 km	1200 ft	5 km
NS Operator 2	600 ft	2 km	1200 ft	5 km
NS Operator 3	600 ft	4 km	1200 ft	5 km
NS Operator 4	600 ft	2 km	1200 ft	5 km

Figure 10: Comparison of VFR Limits for Day and Night Helicopter Offshore Flight Operations

Other reasons for differences between the Applicant's and Spirit Energy's analyses based on weather data are:

- The Applicant and Spirit Energy used different datasets. Spirit Energy has provided its data to the Applicant. Spirit Energy requested the Applicant's data after the 14th December 2018 ISH 1 but has yet to receive it (as at 15th January 2019).

- The Applicant's stated that its data had been based on a ten-year period at the Schooner platform location whereas Spirit Energy's data is based on a one-year period at the Markham J6-A platform location. Spirit Energy would be happy to repeat the analysis process carried out previously using the Applicant's dataset (on the condition that the Applicant has not used averaged data) in order to allow for meaningful comparison with Spirit Energy's dataset.
- Averaging. Spirit Energy's data is presented at 3 hourly intervals with no averaging. The frequency of the Applicant's data and any inherent averaging therein has yet to be determined or disclosed. The most representative dataset would involve no averaging.

The percentage of times IMC occur referenced in the above discussion are all annual averages. There is substantial month to month variability and this appears to reflect the actual variability of weather conditions. In Spirit Energy's revised analysis, the annual average occurrence of IMC is 30% but there are substantial month to month variations with IMC conditions occurring 55% of the time in April.

Chiswick and Grove have both been equipped with circle and "H" lighting enabling flight operations in both daylight and at night. The lighting on Grove has been commissioned and is fully operational. The lighting on Chiswick has not yet been commissioned as there is no need for it whilst the drilling rig is located there. Once commissioned no restrictions due to light will apply to IMC flights at either Chiswick or Grove. Both platforms are restricted due to firefighting equipment to 120 unattended landings per year irrespective of weather.

This analysis demonstrates the substantial prejudice which will be suffered by Spirit Energy if the Application is granted without appropriate protective provisions. This would be contrary to the provisions of EN-3 as outlined in the Introduction and would also prejudice Spirit Energy's ability to fulfil its obligations under the MER UK Strategy.

EXAMINING AUTHORITY'S QUESTION 2.5.15:

Your submission for Deadline 3 [REP3-061] refers to the importance of stabilised helicopter approaches both in poor visibility and in good weather.

Do you consider that the proposed array would compromise stabilised approaches to your platforms in good weather?

If so, why?

SPIRIT ENERGY'S RESPONSE TO QUESTION 2.5.15:

Stabilised helicopter approaches are required in all weather conditions. Spirit Energy is concerned that the effects of turbine induced turbulence have not been considered by the Applicant. The real extent of such



turbulence from large arrays is still a matter of debate in the scientific literature but there appears to be general agreement that turbines induce turbulence and in offshore arrays where topography cannot disperse the turbulence the effects may be significant some distance from the array (for example see para 7.5 of ISH 1 Submission, Appendix ZE – Addendum to AviateQ Report dated December 2018 which refers to such effects up to 14km from the array). If correct, such turbulence would compromise a stabilised approach in good or bad weather conditions.

EXAMINING AUTHORITY’S QUESTION 2.5.16:

Your Deadline 3 submission [REP3-061] explains why, in your view, certain helicopter operations could not be carried out safely. At ISH1 you explained that, typically, personnel are taken to/from Grove and Chiswick Platforms during the same day.

On the assumption that you would not carry out flights assessed to be unsafe, is it reasonable to assume that the main impact would be on your ability to access Grove and Chiswick platforms rather than an impact on the safety of personnel?

Is it reasonable to assume that you would not transfer personnel to Grove and Chiswick platforms if you were not confident that they could be transferred back to J6-A later that day?

SPIRIT ENERGY’S RESPONSE TO QUESTION 2.5.16:

Spirit Energy’s first priority is always safety and no operations will be undertaken or requested of others where the risks to personnel have not been reduced to as low as reasonably practicable (ALARP). It is therefore correct to conclude that the main concern, but not the only, impact of the Applicant’s proposals would be a very considerable reduction in available opportunities to access the Grove and Chiswick platforms.

These platforms operate 24/7/365 and are situated in the dynamic marine and air environment of the North Sea. When faults occur on a platform (which by their very nature are unplanned) the platforms will not be allowed to become unsafe and instead production will be curtailed or shut-in completely until personnel can be mobilised to the platform to effect a remedy. In these circumstances, it is important that access may be taken as soon as possible. Faults will also occur more frequently as facilities age. Thus, restrictions on the currently available opportunities to access Spirit Energy’s assets would adversely affect production and impact the economics and viability of the facilities.

When considering the NUI status of Chiswick and Grove, it is important to note that “NUI” does not mean unmanned at all but it means not with people *resident* on such infrastructure. With drilling ongoing at Chiswick, flights in relation to these NUIs currently take place twice a day (to and from daily).

It is worth noting that Spirit Energy has recently made further investments in equipment (lighting and firefighting equipment) on both Chiswick and Grove in order to facilitate greater ability to fly personnel to these installations.

Spirit Energy acknowledge that helicopter operations are not possible 24/7/365.

Flights are not possible when the sea state has an elevation of >6m or the wind is in excess of 60kts (which occurs on ~16 days/year – i.e. 4% of the time). Until the recent installation of circle and “H” lights, flights were restricted to daylight hours. (This restriction was different in nature to the flight restrictions consequent upon the proposed wind farm, as the former were fixed and certain, and therefore manageable).

As Chiswick and Grove are NUIs, being not normally manned, there are also restrictions to the number of flights based on the firefighting equipment on each platform. Spirit Energy has also recently invested in an upgrade of automated firefighting and foam equipment to an H1/H2 compliant system (in accordance with CAA CAP437) now allowing up to 120 unattended landings per year (and an unlimited number of attended landings). These investments are a reflection of the economic importance to Spirit Energy of minimising restrictions to helicopter access to these fields. Subject to sea state and weather, there is no restriction on when those 120 landings may be applied on any given day in a year or at any time in addition to those landings where personnel are on each NUI (i.e. attended landings).

Although, as noted above, the main impact of the proposed array would be upon the ability to access the Grove and Chiswick platforms, there would also be consequent impacts on economics and their viability. Unacceptable safety impacts are only mitigated by Spirit Energy’s own intervention (restricting its own activities). The policy implications of this are discussed below. Remaining safety impacts are discussed below.

As stated in earlier submissions, the safety cases for both the manned installations and the NUIs are predicated upon helicopters as the primary means of evacuation. Helicopters are preferable to lifeboats and other escapes to water as they allow for a controlled transfer of personnel to a safe haven (often a nearby vessel or installation) whereas, whilst boarding a lifeboat can be accomplished easily, there are significant risks of injury when a free-fall lifeboat launches (whiplash injuries and even broken limbs are not uncommon when the lifeboat impacts the water) and recovery of personnel from a lifeboat is an operation with inherent risks to personnel.

Other means of escape to water carry even greater risks and recovery of personnel in the water places them and their rescuers at heightened risk. In an extreme situation, such as a major fire on the platform, the risks of such secondary means of evacuation are minor relative to the risks of remaining and helicopter evacuation may not be safe or practicable.

There are however many evacuation scenarios which do not involve such immediate danger to personnel

and where helicopters offer by far the safest means of evacuation. By way of example, an incident experienced by Spirit Energy's consultant Max Rowe in his then role as on call Emergency Response Director at another company (see relevant experience at paragraph 1.1.5 of Introduction) illustrates the point. An incident occurred necessitating the evacuation of 150 personnel from an offshore installation – an operation subsequently described by offshore workers as a text-book evacuation. An explosion occurred on an offshore installation. Production was shut-down automatically, and all personnel went to their muster stations. Dr Rowe was called by the installation manager. Whilst he sought to account for all personnel and managed the immediate risks, Dr Rowe mobilised the onshore emergency response team, contacted the Maritime Coastguard Agency and had his logistics team member establish the whereabouts of helicopters that may be able to be mobilised to the platform. The Offshore Installation Manager (OIM) soon advised that all personnel were accounted for and there had been no injuries. There was no fire or gas leak and all systems were shut-down. A small team went out from the temporary safe refuge to assess the damage and reported back that there was extensive localised damage around one of the generators and extending several hundred feet up over higher decks. Personnel were in no immediate danger but having 150 people in the temporary safe refuge (on this platform, a set of locker rooms close to the control room situated at the opposite end of the platform from hydrocarbon processing equipment and protected from it by two blast walls) with only emergency lighting was not a situation to be prolonged. Accordingly, with the assistance of other oil & gas operators and helicopter operators who suspended some of their flights, Dr Rowe was able to coordinate the evacuation of personnel from the platform using helicopters and, with the cooperation of a hotel close to the airport, provide them with overnight accommodation. A team were mobilised to the airport to meet arriving personnel, offer support or counselling and deal with any concerns. This was all unplanned.

Had helicopter access not have been possible in this situation, due to a restriction on helicopter access, and lifeboats been used instead, personnel would then have had to be recovered from the lifeboats to other vessels, not only would personnel have been exposed to greater risks during the course of the evacuation, but the evacuation itself would have contributed to the stress of the experience (some of the personnel involved chose never to return to offshore work) and it would have been far more difficult to provide timely and consistent support to those affected as there would not have been a single arrival point.

Unplanned situations requiring a controlled evacuation of one or more personnel are not uncommon in the North Sea offshore infrastructure industry - recent industry examples include: medical evacuations, platforms becoming uninhabitable due to problems with power or drinking water supplies, bomb scares, and discovery of unexploded ordnance.

It is correct to assume that Spirit Energy would not transfer personnel to Grove or Chiswick platforms unless there was confidence that met-ocean conditions would enable them to be transferred back to J6-A later that day. However, such a restriction derives from the natural dynamics of the weather and sea conditions and not from the presence of intervening artificial obstacles between land and offshore infrastructure that result in affects on safety.

Before taking people to a NUI, an assessment is made based on available weather forecasts and only where there is confidence that personnel will be able to be collected at the end of their working shift will they be taken to the NUI. North Sea weather is however changeable. Should the weather outlook change whilst personnel are on one of the NUIs, efforts will be made to secure helicopter(s) (which may be carrying out flights to other installations or be stationed on the mainland) to collect personnel from the NUI earlier than planned.

To put this in context, over the last three years, there has only been one occasion when personnel could not be collected and had to stay overnight in the Temporary Refuge. However, the more numerous the restrictions upon flying conditions, the greater the possibility that people will end up staying a night on the NUI, but this would never be planned. The probability may be low, but it is an increase (resulting directly from the proximity of the array) from the current ALARP level in the approved Safety Case.

Although short-term weather forecasts are now generally very reliable, they are unable to accurately predict conditions at a particular time and location. Weather forecasts may, for example, say that there is a 10% chance of rain. This is both a spatial and a temporal average. But despite the low percentage, for persons/activities in the location where the rain occurs, it is very relevant. The same is true for helicopter operations. Patchy fog in particular may prevent a landing at a particular installation even though conditions in the vicinity may be very good. The same is true for wind direction. A passing storm or localised weather system may modify the wind direction locally making an ARA that, according to the forecast, would have been able to be accomplished clear of the array, no longer possible.

In light of the above, to correctly assess the impact of the Project upon flights to Chiswick and Grove, it is not sufficient to consider how often conditions would prevent flights. Instead it is necessary to consider whether flights would be undertaken. This would require a forecast showing that current met-ocean conditions and those 9 hours later would allow flights for both the outward and return journeys. This is the basis of revised analysis provided in response to Q2.5.17 below. In light of this revised analysis, it is considered that the impact on Spirit Energy is considerable and adverse.

As is discussed in the Introduction, policy EN-3 is clear that an Applicant is required to minimise negative impacts of its proposals upon offshore infrastructure and activities to ALARP, and that site selection and design should be made with a view to avoiding or minimising disruption or economic loss or any adverse effect on safety. This is consistent with the principle of successful co-existence, and is intended to ensure that the burden of “adapting” does not fall wholly or to an undue extent on existing operators.

Applying EN-3 to the matters discussed in this Response, it would be contrary to policy to expect Spirit Energy (instead of the Applicant) to bear the burden of the flight restrictions without looking to matters of siting and design of the proposed windfarm (as Spirit Energy have sought to do in their proposed protective measures). arising from the Applicant’s proposals for its scheme. There is no mandate in EN-3 for

attributing primacy to wind energy over safety considerations. Indeed, EN-3, paragraphs 2.6.184, 185 and 186, support the contention that ensuring safety is ALARP and that there are no unacceptable risks remains the priority.

Separately, the flight restrictions resulting from the array (in the absence of the draft protective provisions) would adversely affect Spirit Energy's ability to comply with the MER UK Strategy.

EXAMINING AUTHORITY'S QUESTION 2.5.17:

Please provide an update on your discussions regarding helicopter operations.

Please provide your respective assessments of the number of days per year helicopters can (or could) serve Grove and Chiswick platforms now and with the proposed array in place.

Having regard to the fact that Grove and Chiswick platforms are not routinely staffed, what is your overall assessment of the impact of any restrictions on helicopter flights on Spirit Energy's operations in the Markham field?

SPIRIT ENERGY'S RESPONSE TO QUESTION 2.5.17:

On 17th December, Spirit Energy and its expert advisors met with the Applicant and their advisors to discuss both helicopter operations and marine operations. The meeting was constructive and cooperative.

Whilst a number of actions were agreed at the meeting and progress has been made on some of these, the Applicant and Spirit Energy have not yet been able to reach agreement on appropriate helicopter operations.

Spirit Energy and its advisors have based their assessment of the impact of the Project on helicopter operations upon the existing procedures used by helicopter operators in serving North Sea oil & gas installations.

The Applicant on the other hand is proposing significant changes in procedures, which whilst compliant with legal limits imposed by EASA, are not compliant with guidelines published by IOPG or indeed the CAA approved Operations Manuals of the helicopter operators serving the North Sea. It is worth noting that, in the same way as a 30 mile per hour speed limit on a road limits drivers to 30mph but the Highway Code outlines situations where a lower speed may be advisable, the EASA limits are the legal limits whilst the IOPG guidelines take into consideration the nature of regular travel to/from offshore platforms with live hydrocarbons.

Spirit Energy is not itself a helicopter operator and takes its lead from (i) the helicopter operators and (ii) oil



& gas industry standards developed in consultation between major international oil & gas operators such as Shell and BP. These recommendations are published by the International Association of Oil and Gas Producers (IOGP) (see IOGP Aircraft Management Guidelines, Version 2, Report No. 590 (2017)).

Ørsted is proposing that helicopter operators should change their operating procedures to reduce the footprint required for approaches and departures from Spirit Energy's facilities.

It was highly recommended by Spirit Energy that the helicopter operators be approached on the matter to obtain their formal feedback since they are responsible for establishing their Standard Operating Procedures (SOPs) and how they train to them. If the helicopter operators support these changes in standard practice then the proposals could be made to the IOGP for their consideration.

Spirit Energy is following through with its recommendation and will be contacting the aircraft operators regarding the close proximity of the wind turbines to the production platforms. Spirit Energy has drafted a set of questions to be sent to be to helicopter operators, which are not yet agreed by the Applicant.

The aim will be to determine:

- If there are any operation restrictions operating to the Chiswick and the Grove platforms based on current aircraft operator SOPs and if so what are they;
- Is there potential to revise the aircraft operator SOPs and could these revisions be adopted by all North Sea helicopter operators;
- If the SOPs are revised and changes implemented across the industry would there still be operational restrictions operating to the Chiswick and the Grove platforms and if so what are they.
- In the light of discussions with the Applicant and as noted in the answers to Questions Q2.5.14 and Q2.5.16 above, Spirit Energy has revised its assessment of the number of days per year that helicopters would be able to access Grove and Chiswick taking into account:
 - i. VFR minima as given in Table 1
 - ii. Availability of day and night flying now that lighting has been installed on both NUIs.
 - iii. Current standard operating procedures

This leads to the conclusion that currently it is possible to fly personnel to the NUIs and collect them 9 hours later on 150 days per year.

With the windfarm in place, this number would reduce to 24 days per year.

- A significant reduction in the ability to transport personnel by helicopter to and from Grove as required by operational needs may lead to a premature cessation of production and thus a failure to maximise economic recovery from the field. A significant reduction in the ability to transport personnel by helicopter to and from Chiswick as required by operational needs will reduce revenues from production

and increase unit costs thus reducing margins and negatively impacting Spirit Energy's financial performance. Such a reduction would not be consistent with coexistence, a principle that Spirit Energy is firmly committed to. It would also prejudice Spirit Energy's ability to comply with its obligations under the MER UK Strategy. As is discussed in the Introduction, policy EN-3 is clear that an applicant should minimise negative impacts to offshore infrastructure and activities to ALARP, and that site selection and design should be made with a view to avoiding or minimising disruption or economic loss or any adverse effect on safety. This is consistent with the principle of co-existence, and is intended to ensure that the burden of "adapting" does not fall wholly or to an undue extent on existing operators. Applying EN-3 to the matters discussed in this answer, it would be contrary to policy to expect Spirit Energy to bear the burden of the flight restrictions without looking to matters of siting and design of the proposed windfarm (as Spirit Energy is seeking to do in the process of refining their proposed protective measures).

As noted in response to Q2.5.16, the greater possibility of not being able to collect personnel working on the NUIs at the end of their work shift would expose personnel to additional risk and would therefore not be consistent with keeping such risks ALARP.

EXAMINING AUTHORITY'S QUESTION 2.5.18:

Your written representation [REP1-041] refers to well-developed plans for 2 subsea wells 2nm west of Chiswick platform. At ISH1 the Applicant stated that it was not aware of these plans before Deadline 1 (7 November 2018).

Please set out a timeline for these proposals including necessary surveys, consents, investment decisions, design development, procurement and construction.

What information is there in the public domain which provides evidence of your progress towards realising these proposals?

SPIRIT ENERGY'S RESPONSE TO QUESTION 2.5.18:

A detailed timeline for proposal C6 is contained within the Appendix to this document.

By way of commentary, the spreadsheet shows that information, including in relation to the opportunities known as C5, C6 and C7 was presented to the Oil and Gas Authority in 2014, 2015 and 2016.

Opportunity C6 is currently being evaluated by Spirit Energy. That evaluation is dependent upon the results of ongoing drilling operations at C5. Accordingly C6 will not progress to Spirit Energy's "Define" phase until the C5 results have been evaluated and reviewed. It is anticipated that, subject to that review, C6 would progress to the Define phase in Q4 2019.

During the Define phase, details of the well are designed. Subject to the outcome of each phase, it is



anticipated that C6 would progress to Final Investment decision in Q4 2020 with Authority for Expenditure being given in Q4 2021. It is anticipated that drilling would commence in Q4 2021/ Q1 2022.

Opportunity C7 is dependent on the results of the drilling operations at C6. If the results from C6 become available in 2021, it is anticipated that drilling at C7 would not commence until 2025, subject to the outcomes of the various phases set out in the spreadsheet.

Apart from the submissions made to PINS in connection with the Project, Spirit Energy has not released information into the public domain concerning its future drilling plans on Chiswick beyond the C5 well (refer to January 2018 press release included as Document 7, Full Written Representation). The January 2018 press release includes a statement that “Spirit Energy Limited is a leading independent oil and gas operator in Europe, with 2017 production of around 50mboe, and 2P reserves of 409mboe and 2C resources of 216mboe as at the end of 2016.” The 2P reserves of 409mboe and 2C resources of 216mboe are numbers taken from the company’s (confidential) internal year-end reserves statement which documents in some detail how these figures have been arrived at. The 2C resource of 216mboe includes a contribution from C6 and this is set out in the document.

Some industry analysts, such as Woodmac, have recognised the potential for further exploration in the vicinity.

It is not normal practice for proposals for any well to be in the public domain and where a well is considered particularly commercially sensitive (for example the results of the well may make it desirable to secure additional acreage with similar opportunities and so it would not make commercial sense to provide potential competitors for that acreage with this information), no public domain information is available until some time after completion of drilling and analysis of results. Proposals have (confidentially) been presented to the Oil & Gas Authority (OGA) at various stages (as shown on the above timeline). The Secretary of State will therefore be in a position to verify Spirit Energy’s statements concerning its future plans for drilling the two subsea wells C6 and C7.

EXAMINING AUTHORITY’S QUESTION 2.5.19:

Your suggested protective provisions [REP1-032] include an exclusion zone of 2nm and a further exclusion zone of 7.5nm (subject to consultation).

Do these suggested provisions seek to preserve the ability to make instrument flight approaches to all of your assets at all times?

Is it your intention to preclude all WTG within the 7.5nm zone or to ensure that they are restricted in height?

SPIRIT ENERGY’S RESPONSE TO QUESTION 2.5.19:



As outlined in answer to Q2.5.17 any significant reduction in the number of days flights can be conducted should be avoided where possible. The proposed protective provisions are based upon:

- preserving the same aviation access as currently available;
- ensuring that vessel access, although restricted, can be managed safely and with the ability to meet operational requirements; and
- ensuring the same level of early warning of potential vessel collision as currently exists.

As indicated in Spirit Energy's written representation (see ISH 1 Submission, Appendix ZB - Spirit Energy's Proposed Protective Provisions), there may be some flexibility to accept limited restrictions to helicopter operations where it can be shown that these conditions would rarely occur. For example, although J6-A is 6.9nm from the eastern edge of the proposed array, there would only be a small sector of wind directions under which a straight line 7.5nm ARA could not be executed and thus Spirit Energy has been happy to accept that there would not be a material impact on helicopter flights to and from J6-A.

The 7.5nm zone is based upon the worst case assumption of a turbine height of 325m and is a zone within which there should be no such turbines. Should the Applicant install smaller turbines towards the eastern boundary of the array then, as indicated in Spirit Energy's written representation, the radius of the zone could be reduced. For example, for 250m high turbines, the zone with no turbines would only need to extend 6.88nm around each installation in order to allow unimpeded helicopter operations.

As discussed in the Introduction, refinements to the proposed protective provisions will be lodged on behalf of Spirit Energy in due course.

Indicative ARA to Chiswick Platform Showing OEI Missed Approach Profile & OEI Take Off Profile
 EC155B1 - WV270/17kts - Climb Rate 420ft/min @ 75kts IAS

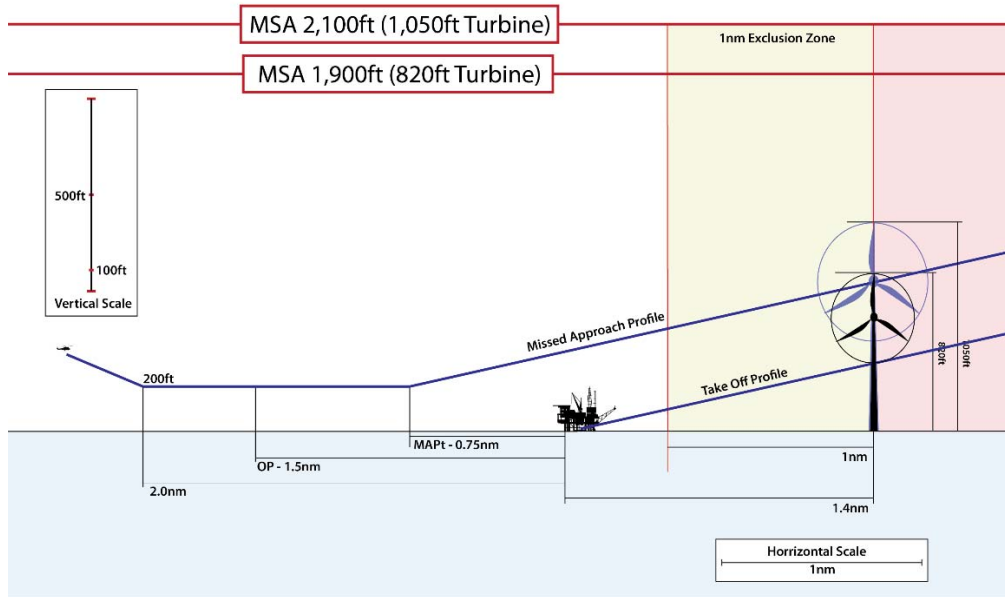


Figure 11: Sectional Diagram showing safe Missed Approach Distances

Descent and Ascent to/from Chiswick for two Turbine heights (325m and 250m)

(Plotted as a projection along direction of wind)

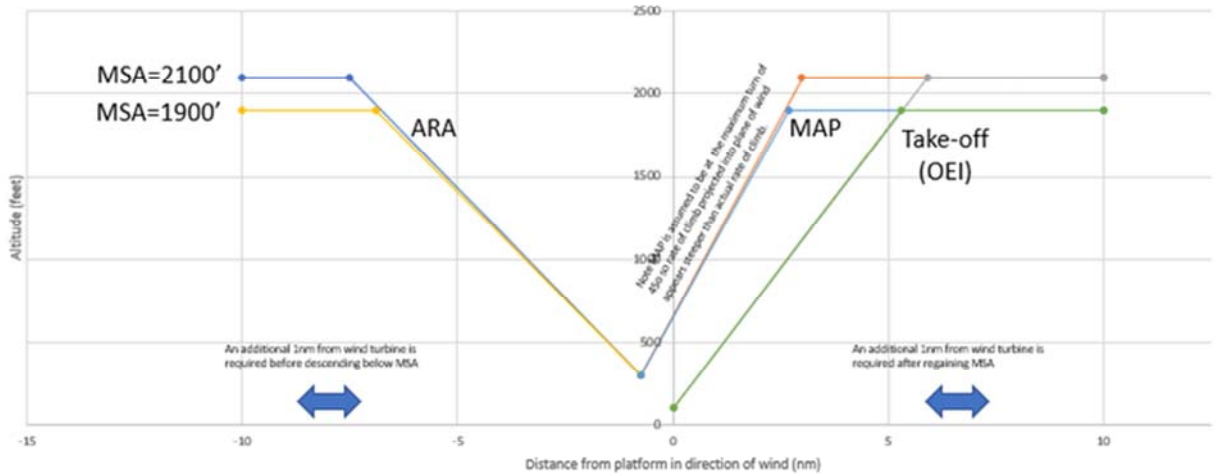


Figure 12

Figure 12 shows the approach, missed approach and take off as a cross section in the plane of the wind direction for two turbine heights given by the Applicant. Since approach and landing are both into the wind there needs to be adequate unobstructed airspace upwind and downwind of the platform.

EXAMINING AUTHORITY’S QUESTION 2.5.21:

Your suggested protective provisions [REP1-032] include upgrading the current warning systems on the J6-A platform to a radar early warning system.

Is the need for this suggested protective provision dependent on the Secretary of State concluding that the proposed OWF would be likely to result in a material increase in shipping in the vicinity of your assets?

SPIRIT ENERGY’S RESPONSE TO QUESTION 2.5.21:

If, as Spirit Energy understand would be the case, it would not be possible using the existing system to reliably detect vessels approaching through the windfarm or, in the case of Grove, coming around the southeast corner of the array within 20 minutes of their expected arrival at the platform, then a system upgrade would be required in order to protect the integrity of the platform. Such an upgrade would be required irrespective of whether the Secretary of State concludes that the proposed OWF would be likely to result in any increase (material or otherwise) in shipping in the vicinity of Spirit Energy’s assets.



**APPENDIX TO THE RESPONSE OF SPIRIT ENERGY TO THE EXAMINING AUTHORITY'S
QUESTIONS OF 19TH DECEMBER 2018**



