

**ITHACA ENERGY (UK) LIMITED**  
**ATHENA BW CARMEN FPSO DEVELOPMENT**  
**Environmental Statement Summary**

**To: Sarah Pritchard – Head of Offshore Environmental Operations**

**From: Angus Laurie – Environmental Manager**

**Date: 31 August 2010**

<b>ES Title:</b>	Athena BW Carmen FPSO Development
<b>Operator:</b>	Ithaca Energy (UK) Limited
<b>Field Group (DECC):</b>	CNS - Mark Simpson
<b>ES Report No:</b>	D/4071/2010
<b>ES Date:</b>	March 2010
<b>Block Nos:</b>	14/18b
<b>Development Type:</b>	Oil with associated gas

### **Project Description**

- The Athena field is located in the Central North Sea (CNS) block 14/18b.
- A semi-submersible drilling rig will be used to drill a water injection well and a new production well. No well test will be carried out on the new production well and Vertical Seismic Profiling (VSP) is not proposed.
- The rig will then re-enter and complete three of the four existing Athena appraisal wells which are currently suspended and complete these as production wells.
- All wells will be tied back to a new production manifold housed within one of two towheads, with integral fishing protection structure.
- The manifold allows for up to six production wells and two water injection wells.
- The Athena Production wells will require artificial lift provided by electrical pumps (ESPs).
- The BW Carmen FPSO will be installed approximately 2km south west of the Athena drill location, on which Athena fluids will be processed and stored prior to export. The FPSO has an eight point mooring system.
- The FPSO will be connected to the production manifold by a trenched flexible flowline system. The number of lines are: 1x production, 1x water injection and 1x service line, 1x electro-hydraulic-chemical (EHC) umbilical and 1x power umbilical. This option will result in between three and five trenches being excavated and backfilled.
- Water injection will be supplied directly from the FPSO to the water injection well and will include produced water from the Athena reservoir.
- Field life estimates range from 3 year (P50) for 4 production well development to 10 year (P10) for 6 production well development.
- Oil will be exported to the Nigg oil terminal via shuttle tankers.

### **Key Environmental Sensitivities**

The EIA identified the following environmental sensitivities:

- Annex 1 Habitats: There are no reported Annex 1 habitats in Block 14/18b.
- Seabird vulnerability is very high in July and August and moderate overall throughout the year.
- Fish spawning area for *Nephrops*, whiting, Norway pout and sprat. Fish nursery for blue whiting, Norway pout, *Nephrops* and sprat.

- The most frequently occurring cetaceans in this block are harbour porpoise, minke whale and white beaked dolphin.
- The Athena development is 89km from the Scanner pockmark.
- The proposed development is situated within ICES rectangle 45E9 and receives considerable fishing effort from demersal trawlers targeting Nephrops and demersal fish.
- An area of moderate shipping density.

### **Key Potential Environmental Impacts**

Potential impacts and mitigation measures were discussed in the ES. Key areas identified with potential for significance within the ES included:

- Drilling discharges;
- Well clean-up flaring;
- Physical disturbance of seabed;
- Underwater noise during construction activities;
- Power generation;
- Chemical use and discharge from the FPSO;
- Emission from crude oil storage and export;
- Shuttle tanker movements;
- Potential for spills, releases and dropped objects.

### **Drilling Discharges**

The surface and top hole sections of the proposed wells (36" and 17.5") will be drilled riserless (i.e. before installation of the BOP and riser) with seawater or seawater/gel water based mud (WBM) with cuttings and mud discharged direct to the seabed. This could result in up to 1030 tonnes of cuttings being discharged to sea. Most of the WBM would be comprised of PLONOR (Poses Little or No Risk to the marine environment) substances. The environmental effects of the discharge of cuttings and WBM are predicted to be localised and of short duration. The effects would involve smothering of benthic habitats and communities but with relatively rapid recovery through faunal re-colonisation. The dominant species in the Athena area are likely to be relatively resilient to the effects of sediment mobilisation and to rapidly recolonise disturbed or displaced sediments. Beyond the zone of physical smothering immediately around the wellhead, ecological effects of surface hole cuttings discharge are predicted to be negligible.

The 12 ¼ " section of the wells will be drilled with an Organo Phase Fluid (OPF) mud with the cuttings retained and shipped to shore for on-shore treatment and/or disposal.

### **Well clean-up emissions**

Production wells will be cleaned up via the test rig after they have been perforated. They will be flowed through a high efficiency well test package and flared until the completion is clear of debris and completion fluids. There are no plans to carry out extended well tests (EWTs). The CO<sub>2</sub> emissions from the Athena drilling, completion and clean-up activities represent less than 0.1% of the 2005 total UK atmospheric emissions and are expected to disperse quickly.

### **Physical disturbance of seabed**

The physical presence of the FPSO, shuttle tanker, drilling rig, installation vessels, flowline laying vessel have been identified as a potential cause of effect, primarily for fisheries. A 500m exclusion zone will be applied for the FPSO location and for the location of the drill centre; fishing and other vessels will be excluded from these areas during field life.

Rig anchoring - Eight fifteen-tonne anchors will be deployed during rig positioning over the drill centre and will produce a 50m linear scar during setting. The total affected seabed area is 2400m<sup>2</sup>. Once all wells have been completed the anchors will be removed. Infill of scars is expected to be quite rapid although scars can be visible for 10 to 15 years.

FPSO installation – the BW Carmen mooring system anchors will be deployed by two methods; either by suction caisson or piling. Both methods are considered similar in terms of seabed effects and potential interactions with other users. A final decision will be informed by the results of the borehole survey and engineering considerations.

Flowline installation - The main effect on the environment from the proposed 2 km flowline system is the physical disturbance during installation, e.g. from trenching, backfilling and potential rock dump (up to 15000 tonnes) and the physical presence of the flowlines. Key receptors to be affected include the seabed, benthic fauna, fish and shellfish, fisheries and other users of the area and water quality. The flowline route has been selected to minimise interactions with large seabed pockmarks. Benthic communities are in a constant state of flux and are able to adjust to disrupted conditions and rapidly re-colonise areas that have been disturbed. So it is expected that recovery will begin almost immediately after the flowline and other infrastructures have been installed.

### **Underwater noise during construction activities**

Underwater noise is increasingly regarded as a potentially important source of disturbance for marine species; particularly marine mammals as these utilise sound for communication and foraging. Underwater noise originates from both natural and anthropogenic sources. The major anthropogenic source in the vicinity of the Athena field is likely to be from shipping traffic (including fishing) and, to a lesser extent, oil and gas exploration and development activity. Underwater noise will also occur from drilling and piling activities, shuttle tanker movements and also from the BW Carmen FPSO under DP during crude oil offloading operations.

In line with JNCC guidance, Ithaca will utilise 'soft start' procedures for the manifold, FPSO anchor and riser piling operations in order to minimise any possible disturbance to cetaceans.

### **Power generation and Flaring emissions**

The principal routine emissions during the proposed development programme would be of combustion products (CO<sub>2</sub>, CO, NO<sub>x</sub>, SO<sub>2</sub>, CH<sub>4</sub> and VOCs) from power generation and engines on the rig, vessels associated with subsea installation/pipeline trenching, helicopters, flaring and power generation on the FPSO. Storage and offloading of crude oil will result in emissions of methane and VOCs to the atmosphere. The CO<sub>2</sub> emissions from the proposed Athena drilling, completion and well clean-up activities represents less than 0.1% of the UK 2005 atmospheric CO<sub>2</sub> emissions associated with UKCS offshore drilling operations.

Initially all the Athena power generation fuel requirement will be provided from the associated produced gas. During the early years there will be some surplus gas which will be flared as there is no outlet for the Athena gas. Available gas is predicted to be depleted after the first year of operations whereupon power generation will increasingly switch to diesel use.

The total net rated thermal output from the BW Carmen will be 47.0 MW(th) and therefore it will require a permit under the Offshore Combustion Installations (Prevention and Control of Pollution) regulations 2001. Ithaca will be required to address the permitting, monitoring and reporting requirements for offshore facilities of Phase II of the EU Emissions Trading Scheme.

### **Chemical use and discharge from the FPSO**

The use and discharge of chemicals from the BW Carmen FPSO is regulated according to the Offshore Chemical Regulations 2002 (as amended). Since the Athena produced water will be re-injected under normal operating conditions, emissions of any water soluble/dispersible chemicals to sea will be minimal.

### **VOC emissions from crude oil storage and export**

VOC losses will occur during crude oil offloading as a consequence of vapours in the inert blanket gas being displaced to the atmosphere as crude oil is loaded into the tanks. The deployment of an additional hose to transfer the inert gas displaced from the shuttle tanker cargo tanks to the FPSO cargo tanks during crude oil offloading will reduce the amount of inert gas (and VOCs) vented.

### **Shuttle tanker movements**

It is anticipated that there will be a tanker offload every 2-3 days during the initial phase of production (year 1). When loaded the tankers will travel to the Nigg oil terminal to offload the cargo. As production decreases in the following years, so will the number of shuttle tanker trips thereby reducing significantly the associated atmospheric emissions. For example during year 2 offloading is predicted to drop to one offload every 5 days. The throughput of oil handled and exported via the Nigg oil terminal has declined in recent years e.g. 192,000 tonnes in 2005 and leading to 54,000 tonnes in 2008. Therefore the Athena production will not create unprecedented levels of shipping traffic into the Nigg oil terminal and surrounding marine area.

Given the limited Athena field life, the use of a shuttle tanker to export Athena production was considered more economical than a new export pipeline to transfer production fluids.

### **Potential for spills, releases and dropped objects.**

A range of control measures such as daylight diesel/chemical bunkering and OPF mud containment will be in place to minimise the risk of accidental events. In addition, an Oil Pollution Emergency Plan (OPEP) and an Emergency Response Plan (ERP) will be prepared and submitted to DECC for approval prior to any drilling or production operations commencing.

### **Cumulative and Synergistic Effects**

Some potential cumulative impacts were identified if physical disturbance from fishing and oil spills from shipping were taken into consideration alongside potential Athena development impacts. However, the probability of this occurring is very low. No significant synergistic effects are predicted for the Athena development.

## Consultee Comments

### JNCC drew attention to:

- Seabed disturbance – JNCC welcomed that rig anchor locations and flowline route selected to minimise interactions with potential seabed pockmarks. JNCC welcomed the use of a mooring analysis but felt it could have been more explicitly incorporated into the ES.
- Acoustic effects of installation options – JNCC noted the options available namely: piling or use of suction cans and reminded Ithaca to utilise JNCC disturbance guidance when formulating a work programme.
- JNCC had no additional comment on the Athena addendum that detailed the intention to proceed with a trenched flowline versus a surface laid bundle.

**Marine Scotland pointed out that there were** no restrictions on drilling operations during the proposed period.

The Public Consultation **did not result in any comments.**

## Further Information

**DECC raised questions regarding:** the uptime of the produced water re-injection system, the presence of breakaway couplings on the crude oil offloading hose, the use of subsea hydraulic fluid and questions over the interpretation of some of the noise level data presented.

DECC received a satisfactory response from Ithaca in a letter dated 8 July 2010.

## Conclusion

Following consultation and the provision of additional information, DECC and its consultees are satisfied that this project is not likely to have a significant impact on the receiving environment, including any sites or species protected under the Habitats Regulations.

## Recommendation:

**On the basis of the information presented within the ES and advice from consultees it is recommended that the Athena BW Carmen FPSO Field Development ES be approved.**

*Sarah Pritchard*  
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*31 August 2010*  
Date