

**TOTAL E&P UK Ltd**  
**LAGGAN-TORMORE DEVELOPMENT WEST OF SHETLAND**  
**Environmental Statement**

**To:** Sarah Pritchard

**From:** Evelyn Pizzolla

**Date:** March 2010

<b>ES Title:</b>	<b>LAGGAN-TORMORE DEVELOPMENT WEST OF SHETLAND</b>
<b>Operator:</b>	<b>TOTAL E&amp;P UK Ltd</b>
<b>Consultants:</b>	Xodus AURORA
<b>Field Group (DECC):</b>	Aberdeen
<b>ES Report No:</b>	D/4055/2009
<b>ES Date:</b>	31 August 2009
<b>Block Nos:</b>	Blocks 206/1 & 205/5
<b>Development Type:</b>	Development
<b>Project Overview</b>	
<p>TOTAL is planning to develop the Laggan-Tormore fields, located in Blocks 206/1 &amp; 205/5 respectively, approximately 85–90 km west of Shetland and 55-65 km from the UK-Faroe median line, to produce gas condensate.</p> <p>As the project incorporates several component parts, three EIAs are required for consideration under the respective offshore and onshore Habitats Regulations;</p> <ol style="list-style-type: none"><li>1. West of Shetland (WoS) Offshore Environmental Statement (ES), covering the drilling of wells at the Tormore and Laggan fields and the installation of the import flowlines, MEG line and umbilical, up to the Bay Closure Line (BCL) at the head of Yell Sound, Shetland.</li><li>2. East of Shetland (EoS) Offshore ES, covering the installation of a gas export pipeline from the BCL with subsea tie-in to the existing TOTAL FUKA line.</li><li>3. Sullom Voe Onshore ES; covering the installation of all the pipelines within the BCL of Yell Sound and into Orka Voe, new Gas Processing Plant (GPP) facilities and the installation of the export pipeline out through Firths Voe up to the BCL.</li></ol> <p>This assessment covers the WoS Offshore ES.</p>	
<b>Project Description</b>	
<p>Total considered developing the fields using an offshore hub, however, the Laggan-Tormore fields will be developed as two, linked subsea developments. The subsea wells will be tied back via two multiphase flowlines to Sullom Voe in Shetland. The final development concept selection and other design decisions were discussed within the ES.</p>	
<b>Wells</b>	
<p>It is anticipated that drilling operations at Laggan-Tormore will be carried out in two phases:</p> <p><b>Phase 1 (2012-2014)</b></p> <ul style="list-style-type: none"><li>• Laggan – three new wells possible plus re-entry of an existing exploration/appraisal well;</li><li>• Tormore – one new well plus possible re-entry of an existing exploration/appraisal well.</li></ul> <p><b>Phase 2 (2015)</b> – two additional wells (one per field) with well siting optimised following the review</p>	

of year one production data.

A contingency of two additional wells is allowed for in the project, in the event that existing wells are found to be unsuitable.

The wells will be drilled from a drill-ship or semi-submersible drilling rig. Initial stages will be drilled using seawater with occasional sweeps of bentonite to assist with cuttings clearing. Water phase fluids (WPF) would be used in lower sections, with cuttings circulated back to the rig and cleaned. The WPF would be recycled and the cuttings discharged to sea. Alternatively, the lower sections of the wells may require the use of oil based muds, (OBM). All cuttings contaminated by OBM will either be contained and shipped to shore for treatment and disposal or, depending on rig capacity, it may be possible to utilise a hammer-mill treatment which evaporates the oily fluids on cuttings to the required standard, leaving a dried, inert powder which can then be discharged to sea. Pre-treatment recovered oil will be recycled and cleaned water discharged.

The wellheads will be fitted with either drill-through horizontal or conventional vertical trees, to allow for maintenance or stimulation of the wells.

Wellheads will be remotely controlled from the (GPP) at Sullom Voe via a control umbilical activating hydraulic valves located on the manifolds. The template manifold structures will have the facility for future additional tie-in options.

All manifolds and any satellite wellheads will be installed within over-trawlable structures to provide protection from dropped objects and fishing gear interaction. The manifolds and protection structures will be fixed to the seabed using suction piles.

### **Pipelines**

In 2012-2013 two 18" carbon steel flowlines, will be surface laid 10 - 50 m apart, from an S-pipelay barge along the offshore corridor, routed directly from Tormore approximately 16km to Laggan, and from there, east south east approximately 125km towards Sullom Voe, using DP or anchors to maintain position, { Approximately 5 km from landfall, the lines will then converge with the existing pipelines (the BP Clair oil pipeline and West of Shetland Gas pipeline) and follow these lines until landfall at Orka Voe and connection to the GPP - Onshore ES }

Offshore, the twin flowlines will be connected by a loop at Tormore to allow round-trip pigging. However, an isolation valve will enable the pipelines to operate independently. This valve will be hydraulically actuated so that pigging can be controlled from the GPP, negating the requirement to have an ROV on location.

For future 3rd party tie-ins, there will be a total of 2 x 4 T-piece locations which will be welded into the pipelines with flange connections for hot-tapping. The tie-in locations will be locally rock-dumped for protection.

External corrosion protection will be 3-Layer Polyethylene or Polypropylene, in conjunction with Al-Zn-In sacrificial anode protection. Internal corrosion will be addressed with extra wall thickness allowance and the use of a chemical corrosion inhibitor.

The first 42 km of the pipelines, located in water deeper than 325m, will be stable however, an external concrete weight coating of 115mm over the anti-corrosion layer will be required as waters become shallower, however, this will reduce to 50 - 65 mm on the approach to Sullom Voe.

An 8" MEG line, also utilising a 3-Layer Polyethylene or Polypropylene anti-corrosion layer and Al-Zn-In sacrificial anodes, will be laid in parallel to the flowlines as will the Umbilical which will deliver power, optical communications, hydraulic and chemical supplies. Both the MEG and Umbilical lines will be protected primarily through trenching and backfill.

Overall rock placement for stabilisation/protection is not anticipated. However, there may be a requirement for some local rock placement at pipeline crossings and T-piece locations and a worst-case estimate, over 24km offshore and on the Continental Shelf, amounts to 120,000m<sup>3</sup>

### **Key Environmental Sensitivities**

The EIA identified the following environmental sensitivities:

- Strong winds, persistent, long-period swells, complex current regimes and rapidly changing weather conditions within deep waters c 640m – to shallow inshore waters

- Highest seabird vulnerability occurs in February, July and September
- Ramna Stacks and Gruney SPA
- Occurrences of cetaceans, including several species of whale and dolphin
- Grey and Hooded seals frequent the area
- Close to important mackerel and blue whiting migration routes and several species spawning areas
- Demersal fishing effort is high

### **Key Potential Environmental Impacts**

The EIA identified the following potential environmental impacts:

- Physical presence causing disturbance to seabird colonies, cetaceans and other sea users
- Seabed disturbance
- Marine discharges
- Accidental hydrocarbon/chemical spills
- Underwater noise on cetaceans
- Light impacts on birds

### **Physical presence**

There will be considerable, although temporary, vessel activity in the area of the Laggan and Tormore fields during the drilling programme and considerable activity along the pipeline route. The physical presence of a drilling rig and support vessels, in addition to a pipe-lay vessel, will present a collision risk to other sea users. Standard mitigation measures including Fisheries Liaison Officers, Notification to Mariners, guard vessels, a 500m exclusion zone, post pipelay surveys to inform the Hydrographic office, etc will be in place.

The pipe-lay & rock-placement vessels may also impact on marine mammal behaviour, especially in inshore waters.

The pipe-lay & rock-placement vessels activities may also impact on the seabird communities associated with the Ramna Stacks & Gruney SPA.

### **Seabed disturbance**

Anchor mounds may be formed from the deployment and recovery of anchors. The drilling rig and pipelay vessels will use dynamic positioning where possible. If anchored vessels are used the rig will utilise the same anchor patterns as far as possible on each location at each site, thereby keeping the number of anchor mounds generated to a minimum. Remediation of the seabed will be employed to remove snagging risks.

Deposition of drill cuttings, drilling mud and cement at the wellhead may change the benthic community in the immediate area by burying some animals and impairing the feeding and respiration of others. However, cuttings piles are not common in areas with strong water column currents such as found in the West of Shetland region and it is expected that the benthic communities will re-colonise the area.

The installation of the pipelines and rock dump may cause localised mortality of seabed animals, temporary disturbance during installation operations and permanent loss of seabed habitat, however, this is not considered to be of significance to the overall abundance and diversity of the subsea communities.

Where rock dumping is required for stabilisation or correction of free-spans or as an alternative to trenching, volumes and locations will be optimised to minimise additional seabed disturbance.

### **Marine discharges**

As well as cuttings, water-based drilling mud, cement and associated chemicals will be discharged. This will have an immediate impact on benthic communities adjacent to the wellhead where discharges from the top sections will be directly to the seabed. However, the cuttings piles are expected to disperse in strong currents and these discharges are not considered to present any significant impact on the water column and its associated biota. WBM will be used where possible

and the use of low-toxicity chemicals will reduce long-term impacts. If OBM is used all cuttings and associated mud will be returned to shore for disposal. Alternatively hammer-mill technology may be used to clean cuttings before discharge while allowing the re-cycling of the mud. Clean cuttings discharged from the rig will be dispersed in the wider marine environment and will not have a significant impact.

There will be the discharge to sea of commissioning chemicals from the pipeline. The exact chemical suite to be used will be finalised during detailed design. However, based on previous experience it is expected that sodium hypochlorite will be used, which is a low toxicity chemical and it is therefore not expected that pipeline discharges from commissioning operations will have a significant impact on the surrounding environment.

Small volumes of hydraulic fluid discharged during the operational phase of the project will be rapidly dispersed in the high energy marine environment of the Laggan-Tormore area.

Although there is fish spawning and nursery in the vicinity of the proposed discharge point, these form part of larger offshore areas and therefore discharges here are not expected to have a significant impact on the overall spawning and nursery activities.

#### **Accidental hydrocarbon/chemical spills**

Offshore oil production and export operations have some risk of accidental hydrocarbon or chemical spill, for example, during bunkering and cargo loading/handling (including mud handling) operations. A detailed oil spill contingency plan will be prepared prior to operations commencing, and which will be documented in the Oil Pollution Emergency Plan (OPEP) submitted to the regulator for approval.

#### **Noise**

Noise generation from offshore activities include Vertical Seismic Profiling (VSP), drilling, vessel movements, in-field and offshore pipe-lay activities, the use of dynamic positioning thrusters. These activities may have the potential to impact mainly upon cetaceans and seals, and otters in inshore areas.

Through using recognised good practice such as timing operations to avoid sensitive periods / populations, monitoring of mammals and potential impacts, and the use of soft starts (building noise levels up slowly to allow animals to move away), the residual noise impacts arising from the operation should be insignificant.

In addition, Total have committed to using an Marine Mammal Observer (MMO) to advise on the commencement of near shore rock-placement operations close to the BCL at the head of Sullom Voe, to minimise the impact on marine mammals within 500m of operations.

#### **Light impacts on seabirds**

Pollution by light is recognised as having a potentially significant impact on seabirds and nocturnal migrant species.. The main sources of light pollution in this development will result from the external lighting on the drilling rig and pipelay and support vessels. Mitigation measures will include minimising the amount of lighting used, as well as ensuring that light is not emitted above the horizontal plane, and completely avoided, where possible, near sensitive populations. Total have also committed to maintaining a 2km exclusion zone around the Ramna Stacks & Gruney SPA during pipe-lay operations and also not to undertake work in that area between 01 September – 31 November in any year to avoid impact on seabird fledgling colonies in the SPA.

**Public Consultation:** No comments were received as a result of the public consultation.

**Consultee(s):**

The statutory consultees for this project were Marine Scotland (MS), JNCC and SNH. All were requested to comment on the ES. The following comments were made:

General comment

It was noted by most consultees that the Bay Closure Line at the head of Yell Sound, which marked the limit of the Offshore ES was not established within the narrative and that the inclusion of operations within Yell Sound had led to confusion.

It was also noted that the CDs provided with the ES and containing supporting information and data were corrupted and illegible causing delay to the review and comment procedure.

Total acknowledged that they had not established the BCL within the ES. DECC provided charts marking the BCL and circulated to all consultees.

Total provided uncorrupted CDs.

Marine Scotland

The project option selection was well described and the final decision of a sub-sea tieback to Sullom Voe justified by the process, as was the pipeline route selection, which opted for a corridor using Yell Sound which already accommodates a number of pipeline entries to Sullom Voe. The ES adequately describes the environmental conditions at the Tormore – Laggan locations and along the selected pipeline route, using both generic (AFEN) data and offshore site specific data collected by Total.

MS noted some minor comments on presentational aspects and asked for further clarification on the risk of trawling operations dislodging a radioactive source in multiphase flowmeters; a review of the figures presented from the cuttings modeling and atmospheric emissions.

MS also requested copies of pertinent site specific surveys.

Total provided supporting information and clarification on the above comments. Total confirmed that the flowmeters would be protected by overtrawlable structures and there could be no possibility of damage resulting in a release of radioactive material; Total provided clarification of all calculations in the ES. Following receipt of this information and the full site survey reports, MS were content for the ES to receive approval.

JNCC:

In general, JNCC considered that certain sections were very well written, whereas other parts suffered from a lack of quality and the information was presented in a way that was not easy to comprehend and identified a number of issues to be addressed.

JNCC felt Total should have better defined the scope of the offshore ES and that it would have been useful if the limits of the Bay Closure lines were marked within the figures presented in the ES.

JNCC considered there was limited information in the ES as to how Total ranked the significance of factors such as ‘health and safety’ and providing ‘best value for the Laggan Tormore partners’ (page 10) and that further information on these aspects would have reassured that the overall decision was not based on cost alone.

JNCC queried the conclusion that 3<sup>rd</sup> party tie-in would not be achievable with a Tension Leg Platform (TLP) platform.

JNCC accepted that the subsea development with onshore hub would provide considerable health and safety benefits in terms of eliminating the requirement for offshore staff, and associated helicopter transfers, however, they queried the potential for a future unmanned TLP.

JNCC asked for clarification of the the rock dump figures presented in table 3.5 and for more clarity

on exactly which lines would be covered and where.

JNCC noted that the supporting data supplied on 3 CDs with the ES were corrupted and illegible.

The operator provided more detail on the valuations and reasoning applied in the option selection process between onshore and offshore processing.

Total clarified the rock requirement calculations and the areas to be covered along the pipeline lengths and tie-in points.

On the basis of the information provided in the ES, the responses to requests for clarification and a review of uncorrupted supporting data, JNCC were content that the proposed development and pipe-lay operations were unlikely to have a significant environmental impact in the offshore marine environment.

### SNH

SNH noted that the ES had not sufficiently delineated the BCL and the inclusion of operations within the Yell Sound had led to confusion.

SNH requested that uncorrupted CDs providing supporting data should be forthcoming.

SNH objected to the proposal on the grounds that insufficient information had been provided within the ES to determine the likely effects on European Protected Species (EPS) and the wider marine environment.

SNH concern was in regard to the Ramna Stacks and Gruney SPA and the impact pipelay and associated operations would have on the seabird colonies. They requested the implementation of an appropriate temporal mitigation which they identified as 01 September – 31 November in order to protect fledglings within the SPA. In addition they indicated they would advise a 2km-5km exclusion zone for operations and the use of special light features on all vessels.

Total agreed to the request for a 2km exclusion zone from the boundary of the SPA. They also committed not to undertake any pip-lay or associated operations between 01 September – 31 November in any year and that all operational vessels would be equipped with lighting that would not emit above the horizontal plane.

SNH were content that the mitigation measures to be employed would be sufficient to eliminate concerns for the SPA.

SNH were also concerned that cetaceans may be present in the offshore area, prior to or during proposed rock-placement operations and that the effects of noise arising from the works in combination with the use of Dynamic Positioning (DP) was an area of potentially significant concern. SNH requested more information on the location, frequency and magnitude of rock dumping operations.

Total provided additional information and a detailed Technical note assessing the impacts of DP vessel and rock-placement operations noise.

Following the provision of the information SNH indicated that they were still not completely satisfied that these operations would not cause a disturbance to cetaceans in the area and an EPS licence may be required. However, SNH suggested mitigation measures, quoting JNCC guidelines, which Total considered. These were that an MMO should be present and no rock placement should commence until it was confirmed no cetaceans were in the area, and this for a distance of 3km from the BCL. Total agreed to this request.

**Further Information:**

DECC LED

LED noted that the Laggan and Tormore field Latitude and Longitude references had been transposed. They also queried the forecast production figures in the ES as reflecting the 2P case as opposed to the 3P case in the FDP.

Total confirmed the error in the geographical references. DEC OED noted the 2P case as a worst case scenario for associated emissions and did not ask for revised figures.

DECC OED

OED noted that the BCL had not been established in the ES and that the inclusion of operations within Yell Sound led to confusion and that supporting information on the CDs was illegible.

OED also asked for clarification on concrete coating requirements for stabilisation and the areas and distances in which it would be employed; confirmation of the rock protection required for the import flowlines outwith Yell Sound, and clarification of the mitigation measures proposed in the ES for operations around the Ramna Stacks & Gruney SPA.

Total provided clarification on the above points to the satisfaction of OED.

**Conclusion(s):**

Following consultation, DECC and its consultees are satisfied that, with the implementation of mitigation measures in defined areas, 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(s):**

**On the basis of the information presented within the ES and advice from consultees it is recommended that the ES should be approved.**

*Sarah Pritchard*

*17/03/2010*

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**Sarah Pritchard**

**Date**