Memorandum

To: Clare Morgan

Cc: Michael Hanrahan

From: Stephen Jewell

Date: 21st March 2019

Subject: Kinsale Area Fields – Decommissioning Plan
– Consent Application No. 1, Technical Review

Introduction

An application for consent (the "**Consent Application**") for the decommissioning of the Kinsale Head and Ballycotton fields (Ref.1) has been received by the Department of Communications, Climate Action and Environment ("**DCCAE**"). The Consent Application is dated 28th June 2018 and has been subject to a statutory period of public consultation, now closed.

This memorandum summarises the findings of a technical review of the Consent Application submitted by the applicant, PSE Kinsale Energy Limited ("**KEL**"). In this application, referred to as No. 1 or Phase 1, only the removal of topsides, subsea facilities (manifolds / jumpers etc.) and wells is covered ("**Facilities**"). Pipelines and Jackets will be addressed in a further application, No. 2 or Phase 2. This memorandum considers only items included in Phase 1, or circumstances where a Phase 1 activity may have an impact on subsequent Phase 2 decommissioning.

Guidelines related to offshore installations (excluding wells) issued in 2018 by the UK Regulator (Ref. 2) have also been reviewed for comparison and a number of observations made.

Finally, responses to the Public Consultation have been considered and any relevant technical matters identified.

Summary of findings, conditions and recommendations

1. **Overall there are no technical concerns with KEL's consent application that would prevent the Minister of DCCAE from consenting to the Consent Application**. KEL's proposed approach to decommissioning is conventional and consistent with that taken by Operators in the UK sector of the North Sea to date with similar aged infrastructure. Options on the final method adopted for decommissioning the Facilities (removal of topsides only) as presented by KEL are reasonable and in-line

with the requirements of OSPAR 98/3. Consenting to a multi-option approach makes sense and will allow KEL to optimise the execution of the decommissioning works in terms of both time and cost.

2. **None of the activities proposed in this application will prejudice the planning or implementation of any future phases of the decommissioning at Kinsale related to platform jackets and pipelines**.

3. KEL states that economic and technical evaluations to justify the proposed CoP (Cessation of Production date) for Kinsale will be provided separately to the Minister. **Approval of any decommissioning plans should be conditional upon a satisfactory justification for the proposed CoP.**

4. Approval of the Consent Application should be conditional upon decommissioning starting by a defined date agreed with KEL and all consented activities should be completed within three years of the start date.

5. No viable case for the re-use of Kinsale Platform topsides or wells has been identified by KEL, nor proposed by any third parties.

6. Re-use of the Kinsale wells for CO_2 storage is not likely to be viable owing to the unsuitability of the well completions. Furthermore, the suitability of the reservoirs for CO_2 storage has not been determined and would require a significant technical evaluation to do so.

7. DCCAE should consent to the plugging and abandonment of the wells in principle, but not to a specific method (as presented). Approval of actual methods for well abandonment are a matter for the Commission for the Regulation of Utilities (CRU).

8. It is understood that the former Exploration and Appraisal (E&A) wells on the lease have already been plugged in accordance with an earlier consent. The removal of the associated wellheads (and surface casing stumps) is the final stage of the complete well abandonment process and consent to complete this activity is now being sought.

9. Decommissioning cost estimates and reporting should follow good oilfield practice. Clearly distinguishing between the Kinsale and Seven Heads leases should be a condition of consent.

10. The proposed Decommissioning Close Out report makes no reference to wells or costs. **Appropriate references to both wells and costs should be made in all reports related to the field decommissioning and this should be a condition of consent**.

11. For seabed clearance the term ‘significant debris’ is used by KEL with no further definition of what ‘significant’ means in practice. Under DCCAE Rule 3.8.2 KEL is already required to demonstrate that the seabed has been adequately cleared of

debris through the submission of a 'Seabed Clearance Certificate'.

12. Following a review of the UK guidelines (Annex C in particular) (Ref. 3), DCCAE may wish to consider the following points:

    - 'Exceptional Circumstances' are addressed as far as possible in the UK to deal with circumstances that may arise whereby the original intended decommissioning plan cannot be executed, perhaps for technical reasons (e.g. a wellhead cannot be cleanly cut and removed as planned);

    - In the UK deferral of decommissioning activities would only be permitted where re-use has already been identified – this may be relevant to the proposed (but as yet unsubstantiated) 'concepts' in Ireland e.g. CO_2 storage or wind turbines; and

    - The UK does not require independent verification of all decommissioning activities but encourages it.

13. The public consultation yielded the following broad points:

    - Kinsale Area facilities should be retained for potential future CO_2 storage;

    - Kinsale Area wells should be abandoned in such a way as to retain suitable integrity to accommodate CO_2 storage in the future; and

    - Kinsale facilities may also be of potential future use for exploration success resulting from the activities of neighbouring Authorisation Holders.

    In all cases no justification for the technical suitability of the facilities (design or condition) has been provided, nor were any suggestions made regarding how the cost of preservation or ongoing liabilities would be covered. The various proposals could be described as immature and not sufficiently developed to prevent or delay the ongoing preparations for decommissioning.

14. KEL's responses to the public consultation are reasonable and consistent with its previously stated position(s). However, **DCCAE should verify whether an amendment to a consented Decommissioning Plan is a feasible and practical means by which future opportunities to facilitate the re-use of infrastructure can be accommodated.**

Kinsale Area Fields

Section 1 – Background, Methodology and Overview

The historical background information and methodology described is appropriate for the proposed technical decommissioning works.

The overview of the decommissioning plan provides a convenient summary of all the activities required to complete the decommissioning of the Kinsale Area fields.

The objectives stated appear reasonable with no obvious omissions.

Section 2 – Facilities Description

A brief description and history of the fields and related facilities, including wells, is provided. Reference is made to the Seven Heads Field which is tied back to the Kinsale Field area complex (Seven Heads is subject to separate consent covered below).

Condensate production through the Kinsale facilities is stated as being confined to the Seven Heads field only i.e. the Kinsale area fields do not generate any discernible condensate. It is further stated that no LSA (Low Specific Activity) scale or NORM (Naturally Occurring Radioactive) scale has ever been detected at Kinsale.

A high-level inventory of all wells and other facilities (platform and subsea) is provided in Section 2.2. The wells inventory includes three E&A (exploration / appraisal) wells (48/25-2, 49/16-2 and 48/20-1A) which have been previously plugged under an earlier consent. The wellhead and casing stumps on each of these wells still needs to be removed and it is understood that it is consent for this final stage of the well abandonment that is now being sought.

It is stated that there are no cuttings piles present in the Kinsale area related to historical drilling activities and this was confirmed in a recent survey (2017). Drilling at Kinsale has been undertaken on all wells using water-based muds, with only one exception. The Greensand well (48/25-6) was drilled with oil-based mud, however all cuttings were shipped onshore and there were no overboard discharges.

Section 3 – Cessation of Production (CoP)

KEL describes the reasoning for the anticipated cessation of production for the Kinsale area fields. It is clear given the present rates of production (around 20mmscfd) and the compressor suction pressure limit which has now been reached (around 5 psig), that the fields are approaching the end of their productive lives. The stated recovery factor (RF) for the field (96%) should be considered with caution as, with all recovery factors, it assumes

that the gas initially in place (GIIP) estimate is correct. Irrespective of the RF, it is clear from operating pressures that the fields will be unable to produce economically for much longer – operating conditions are at the technical limit. It may be possible for KEL to decommission some or even all of the wells without actually declaring CoP. DCCAE might wish to make consent to decommission the wells conditional upon some form of CoP to avoid such a situation arising.

KEL states that technical and economic evaluations to justify the proposed CoP date will be provided separately to the Minister. Approval of any decommissioning plan application should be conditional upon a satisfactory justification for the proposed CoP.

KEL has briefly considered other uses for the wells and facilities and has detailed these in the consent submission. In my opinion, further use of the gas processing equipment for production of associated gas from neighbouring hydrocarbon prospects cannot be properly evaluated until a firm associated gas production profile can be established. Appraisal well drilling (and fluids testing) would be required at Barryroe, for instance, to establish such a profile and this is most likely to occur after Kinsale becomes sub-economic.

Re-use of the reservoir, wells and platform facilities for CO_2 storage are the subject of a feasibility study being undertaken by Ervia. However, there are a number of technical constraints which will need to be carefully assessed in determining the viability of such a development. These are listed below:

- evaluation of existing long term well integrity to CO_2;
- corrosion resistance of pipelines and other facilities to CO_2; and
- reservoir suitability and storage capacity based on reservoir structure and overburden stress limits.

KEL also points out the present weak commercial position for such a scheme because of current low CO_2 prices.

KEL's position is that whilst re-use for offshore wind power remains a possibility, no feasible scheme has yet been proposed to them. Offshore wind schemes in the UK have been installed to exploit disused offshore oil and gas facilities (Beatrice Field) but the commercial robustness of such an approach is unknown and presently unclear.

KEL concludes that no re-use options for its wells and facilities have yet been identified but is open to the idea of retaining at least the platform structures (jackets) and some of the pipelines being preserved for re-use pending more detailed study of such options. Care should be taken to ensure that such delays to the completion of the field decommissioning are not economically driven and that a delay to the removal of the platform structures is simply financially more attractive to KEL, irrespective of the merits of any re-use opportunities.

Section 4 – Decommissioning Options

Platform Topsides

KEL has concluded from several other studies (Genesis 2011, AllSeas 2012a, Xodus 2016d) that re-use of the platform topsides either in position, or elsewhere, are not feasible primarily on the basis of age. This is a reasonable conclusion since the Kinsale facilities are now over forty years old and are unlikely to have any significant useful life remaining beyond the current plans. The options considered in the Consent Application centre around the method of removal/disposal and this can be summarised as 1) a single lift removal of all modules on each installation, or 2) removal of the various facilities modules in a reverse installation approach (piece-medium) or 3) removal of module components (piece-small). In all cases the predominantly steel waste will be recycled onshore.

KEL's final decision on the best approach will be dictated by a number of commercial factors, including availability and cost of suitable vessels / equipment at the time of decommissioning itself. Detailed assessment of the three options (or a combination of 2 and 3) will be required by the Operator, in conjunction with commercial considerations, before a final choice of method is made.

KEL's approach is reasonable and consistent with that taken by Operators in the UK sector of the North Sea with similar aged infrastructure. Nothing unconventional or odd is being proposed for the decommissioning of the platform topsides. Consenting to a multi-option approach will permit KEL to optimise the execution of the decommissioning works and is consistent with the practices undertaken in neighbouring jurisdictions.

Platform Wells

KEL is proposing to plug and abandon the wells in accordance with established good industry practice (Oil & Gas UK Guidelines 2015). Well conductors and other casings will be cut below the seabed in anticipation of jacket removal later. No options for the re-use of these wells (and/or related infrastructure) have been identified to date.

The approval of actual methods of abandonment will be a matter for the CRU.

Subsea Wells

KEL proposes to plug and abandon its subsea wells using either a conventional drilling rig or Lightweight Intervention Vessel (LWIV). This combined approach would enable any wells not successfully abandoned with the LWIV to be re-entered and fully abandoned with a rig.

Three wells in the Kinsale area are former exploration and appraisal (E&A) wells which have already been plugged downhole but still require removal of the surface wellhead (and associated casing strings to below the mudline). It is understood that consent for this activity is now being sought.

Section 5 – Project Management

Management of the decommissioning project will be undertaken in accordance with Petronas' Project Management System (PPMS) – this system appears to adopt a 'stage gate' approach which would be considered 'best practice' by most larger organisations in the oil and gas industry.

The organisation and resources plan are presented at a high level and the intended method of reporting to the Regulator(s) is described. All the proposed reports and frequency of reporting look reasonable and should provide the various Regulators with sufficient information to monitor activities and to establish if the project remains 'on schedule' and/or 'within budget'.

The Consent Application states that a cost estimate will be provided to DCCAE separately. DCCAE should request an initial cost estimate for all proposed activities prior to the start of decommissioning works. DCCAE should also make it a condition of any consent that a monthly report of costs be provided, either as part of the proposed monthly activity reporting or else as a standalone report if including costs is a sensitive matter. The provision of cost information will assist DCCAE in the monitoring of activity levels and progress. Since the Seven Heads field is being decommissioned at the same time, the allocation of costs between the two leases should also be rigorous and transparent to DCCAE.

Section 6 – Activities and Schedule

KEL provides a chronological breakdown of all anticipated activities needed throughout the process of field decommissioning – this is presented at a high level (which is appropriate) and covers the period prior to CoP through to the completion of all decommissioning operational activities. Post decommissioning inspections and reporting etc. are covered separately. An indicative project schedule is provided to show how the various activities will be executed.

Materials and waste management are covered in section 6.5 where tonnages of various waste streams are detailed along with their anticipated transport and ultimate fate (disposal or recycling).

Finally, reference is made to KEL's long established HSEMS and the various Safety Cases that will be required in order to execute the proposed decommissioning plan.

Section 7 – Post Decommissioning

The post decommissioning matters described in the Application are covered here but may actually need to form part of the No 2 or Phase 2 application, since they cannot be properly addressed until the fate of the jackets and pipelines is known. However, some points have been addressed here.

The post decommissioning survey described does not define what is meant by 'significant debris'. However, KEL will be required to issue a Seabed Clearance Certificate under Rule 3.8.2 which should ensure satisfactory clearance of the seabed has been achieved. There is no reference to inspection of abandoned well locations to detect the presence of hydrocarbons. DCCAE may wish to consider conditioning a suitable inspection and defining/agreeing a method and timing (e.g. after 12 months) to confirm integrity of all abandoned wells. In the UK at present Operators are under no obligation to inspect wells for leaks once the wellhead is removed and the well is considered fully abandoned. Further thought should be given to what is meant or intended by 'residual liability' and 'post decommissioning monitoring'.

The Decommissioning Close Out report proposed by KEL in section 7.3 should also explicitly include the following:

1. An Operations Report
2. A Verification Report on Operations

It is recommended that KEL is also requested to include appropriate references to wells and costs in all decommissioning close-out reports.

Section 8 – Environmental Assessment

This section has not been reviewed here.

Section 9 – Stakeholder Engagement

This section has not been reviewed here.

UK Guidelines for Decommissioning of Offshore Oil and Gas Installations

Decommissioning in the UK provides a good comparator for activities in Ireland because the marine environment is similar, the UK has experience of a number of different decommissioning projects and is also operating under EU legislation.

UK guidelines have recently been re-issued (2018 – Ref. 3) by the UK Offshore Petroleum Regulator for Environment and Decommissioning (OPRED), a division of the UK Department for Business, Energy and Industrial Strategy (BEIS). We have briefly reviewed these guidelines in the context of the Kinsale and Seven Heads consent submissions. The following high-level observations have been made:

- the UK has a 5 stage Decommissioning Programme process – summarised in Figure 1 below - it is unclear which stage of the UK's decommissioning process is most comparable to the Irish consent application. It appears to be a combination of Stage 2 and Stage 3 (see Section 5 of Ref. 3)
- In section 5.18 it states that deferral of decommissioning activities is only permitted where re-use has been identified – this is relevant to the jacket deferral option at Kinsale, to be considered in Application No. 2
- Section 7.26 Exceptional Circumstances covers occasions where, for instance, the full removal of the jackets is not possible for unforeseen technical reasons (e.g. excessive grouting during installation) – this should be addressed in consideration of Application No. 2
- Pipeline monitoring post decommissioning (Sections 10.20 to 10.22) is a requirement in the UK and any associated monitoring programme (extent and frequency) must be agreed with the Regulator – this should also be considered when reviewing a No.2 application
- Verification of seabed clearance surveys is a requirement (Annex c 15), although independent verification appears to be voluntary, but encouraged – see Close Out Report Section 14.2. OPRED states requirements for independent verification which are referred to at several points in the UK guidelines
- Annex C details what the UK Regulator expects to see in a Decommissioning Programme but this appears to be more detailed than that required in Ireland for a Consent Application

Stage 1 Early discussions	Stage 2 Planning & producing the Decommissioning programme	Stage 3 Submit the programme	Stage 4 Execution of the programme	Stage 5 Close out
Preliminary discussions with OPRED Possible option screening for pipelines Data & evidence collection & surveys	Detailed discussions with OPRED Assessment of options - Comparative Assessment or similar including assessment of risk Development & submission of consultation DP and Environmental Appraisal to OPRED and through consultation to other interested parties /public for consideration Derogation case - OSPAR consultation prior to final submission	Draft DP following comment resolution with OPRED Formal submission of the DP and approval under the 1998 Act	Commence main works Regular DP progress reports to OPRED Identify and discuss potential DP revisions	Close Out report & detail of all post DP surveys, within one year of full completion. Update OPRED with amendments to post DP monitoring plan Monitoring of site & site remediation as required Management plan for any infrastructure remaining in situ

Figure 1: UK Decommissioning Programme 5 Stage Process (see Ref. 3)

Responses to the Public Consultation

The following documents have been reviewed, being responses to the Public Consultation on Kinsale Area Decommissioning conducted by DCCAE:

- *Letter from CRU regarding Safety Permit, dated 20th July 2018*

  CRU points out the need for a Safety Permit in the consenting and execution of decommissioning activities.

- *Letter from An Taisce, dated 27th July 2018*

  An Taisce writes about environment related matters only.

- *Letter from Lansdowne Oil and Gas, dated 20th July 2018*

  Lansdowne, as Partners in the Barryroe discovery, support the points made by Providence.

- *Letter from Predator Oil and Gas Holdings, dated 30th July 2018*

  Predator Holdings state generally that the Kinsale Area facilities should be preserved for the future development of oil and gas prospectivity they have identified in the area – this includes gas storage potential. Predator does not address the related technical suitability, condition or cost of preservation issues.

- *Letter from Providence Resources, dated 30th July 2018*

  Providence state that the Seven Heads manifold, export line and Kinsale 24" export line might be of use to them in the development of the Barryroe discovery. Providence does not confirm that these facilities would actually be technically suitable, nor does it address the cost of preservation of such facilities pending approval of any Barryroe development.

- *Correspondence from ESB, dated 31st July 2018*

  ESB identifies the potential use of the Kinsale area reservoirs and facilities for future CO_2 storage but provides no technical or commercial basis to justify their re-use. ERB suggests that the wells be abandoned in such a way as to permit future use of the reservoir for CO_2 storage purposes. The actual method of abandonment is a matter for the CRU, however well abandonment design and cost may differ if future CO_2 storage remains a possibility and consideration would need to be given as to how, and by whom, such costs would be incurred.

- *Email from Sea Fisheries, dated 30th July 2018*

  Sea Fisheries had no comment.

- *Correspondence from Ervia, dated 31st July 2018*

  Ervia point out that they are currently carrying out a feasibility study for use of Kinsale for CO_2 storage. Like ESB they recommend that wells are abandoned in such a way as to preserve the reservoir integrity for CO_2 storage purposes. They propose the preservation of the 24" onshore pipeline for CO_2 transportation and request that previously abandoned wells are made suitable for CO_2 storage.

  Ervia offers no evidence to demonstrate the technical suitability of the onshore pipeline for CO_2 storage. Ervia does not address the cost of preserving infrastructure.

KEL's comments to the Public Consultation responses

In respect of Predator's response to the Public consultation, KEL states that (Ref. 3):

1. KEL has always been supportive of making Kinsale and Seven Heads' infrastructure available to third parties to accommodate technically and commercially viable gas discoveries in the area
2. KEL has not been approached by Predator (or any other party) in respect of 1. above.
3. Other than KEL no other company has drilled an exploration well for dry gas in the North Celtic Sea within the last 10 years
4. There are no material gas reserves remaining on the existing Leases

In addition, KEL states that it still wishes to progress consent for its decommissioning plans as soon as reasonably practicable but remains open to the possibility of a transfer of infrastructure ownership, on commercial terms. KEL suggests that if such an alternative opportunity arose after consent for decommissioning had been secured then it would lodge an amendment to its application to accommodate this.

In my opinion KEL's responses are reasonable and consistent with its previously stated position(s).

DCCAE should verify whether an amendment of the kind proposed by KEL is feasible and respond to KEL accordingly.

In respect of Ervia / ESB's responses to the Public consultation (Ref. 4), KEL states that:

1. KEL has previously engaged with Ervia and ESB in respect of a CCS and will continue to do so.
2. If requested KEL would participate in steering / working group which Ervia and ESB recommends should be set to consider the feasibility of CCS at Kinsale / Seven Heads.

3. KEL would be willing to work with Ervia and ESB to assess the feasibility of 'abandoning' wells in a way which would permit re-use for CCS purposes in the future. However, KEL would be expected to be financially compensated for any additional costs incurred.
4. KEL accepts that Ervia's request to use existing production wells for acquiring data before they are abandoned could be accommodated, subject to operational constraints and a reasonable commercial agreement between the parties.
5. Ervia's recommendations regarding the 24" pipeline preservation and cutting of the Kinsale jackets might also be feasible but would be subject to further discussion with Ervia.

KEL restates that it still wishes to progress consent for its decommissioning plans as soon as is reasonably practicable. KEL further suggests that any additional opportunities arising from further discussions with Ervia / ESB are handled as an amendment to the consented decommissioning plan.

With regard to responses from Providence and Lansdowne (Ref. 5), KEL states that it welcomes an opportunity to facilitate re-use of facilities at Kinsale and Seven Heads resulting from any appraisal drilling of the Barryroe discovery. However, this would need to be on commercial terms, and KEL rightly points out the difficulties in respect of timing of the Barryroe appraisal well and the influence this would have on any potential development decision making and timing.

KEL restates that regardless of any present or future ideas from third parties it still wishes to progress consent for its decommissioning plans as soon as is reasonably practicable.

In my opinion KEL's responses are reasonable and consistent with its previously stated position(s).

DCCAE should verify whether an amendment of the kind proposed by KEL is feasible and respond to KEL accordingly.

Stephen Jewell
Selgovia Limited

References

(1) Decommissioning Plan – Kinsale Head Petroleum Lease (OPL-1) – Consent Application No. 1, 12th June 2018, Hartley Anderson-ARUP
Doc Ref: 253993-00-REP-16

(2) Guidance Notes for the Decommissioning of Offshore Oil and Gas Installations and Pipeline, May 2018, published by UK Department for Business, Energy and Industrial Strategy

(3) Letter from Fergal G Murphy (KEL) to Bill Morrissey (DCCAE) dated 18th October 2018 re. Predator Observations

(4) Letter from Fergal G Murphy (KEL) to Bill Morrissey (DCCAE) dated 18th October 2018 re. Ervia / ESB Observations

(5) Letter from Fergal G Murphy (KEL) to Bill Morrissey (DCCAE) dated 18th October 2018 re. Providence / Lansdowne Observations