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Dear Sir/Madam,

## **Towards Fusion Energy: The UK's proposals for a regulatory framework for fusion energy**

### **Consultation response from Nuleaf**

#### **1. Introduction**

Nuleaf (the Nuclear Legacy Advisory Forum) is a Special Interest Group of the Local Government Association (LGA). We are directly supported by over 100 local authorities and national park authorities across England and Wales. Our remit encompasses all aspects of the management of the UK's nuclear waste legacy, including interim storage, treatment and disposal. Our primary objectives are:

- to provide a mechanism to identify, where possible, a common, local government viewpoint on nuclear legacy management issues;
- to represent that viewpoint, or the range of views of its member authorities, in discussion with national bodies, including Government, the Nuclear Decommissioning Authority (NDA) and the regulators;
- to seek to influence policy and strategy for nuclear legacy management in the interests of affected communities; and
- to develop the capacity of its member authorities to engage with nuclear legacy management at a local level.

Nuleaf is active in advising Government, the NDA and RWM on all aspects of strategy, policy and practice in decommissioning and the management of nuclear waste. We sit on the UK Government's Radioactive Substances Policy Group (RSPG) and on a number of NDA fora.



While Nuleaf's focus is on decommissioning and legacy waste management, we do engage in proposals for new nuclear development, including technologies such as fusion, due to their impact on the UK's nuclear legacy and on NDA sites.

Our members met with UKAEA last year and a number of them are involved in the siting process for the STEP fusion facility. As the consultation notes, local planning authorities (LPAs) are a regulatory body for the development of fusion and local authorities also play an active role in Emergency Planning. Councils therefore have a significant interest in these proposals and an important role in the delivery of fusion in the UK.

Given our remit we are only responding to those questions of most relevance to our members.

## **2. Overarching comments on the proposals for a regulatory framework for fusion energy.**

The launch of the STEP (Spherical Tokamak for Energy Production) programme is an important milestone and, together with other current activity by private companies, represents a step change in the development of fusion technology in the UK.

The Government states that the proposals in this consultation '*aim to enable the safe and rapid deployment of fusion energy power plants.*' (p12). This, along with the recent publication of **Toward's Fusion Energy**, the UK Government's Fusion Strategy, requires that proposals for regulation and waste management do not simply relate to the relatively small-scale STEP development, but potentially to a much larger fusion programme in the future.

The proposals in this consultation have therefore to be tested against that wider outcome. As the consultation notes, they have to be '*fit for purpose*' over at least 20-30 years. Our response to the questions is informed by this wider and longer-term context.

We would like to highlight areas of this consultation document that we feel require more explanation:

- It would be useful to clarify what is meant by 'high fuel efficiency'. (page 18) While it may be true that fusion plants are, theoretically, highly fuel efficient, it is confusing that in the next paragraph the document states that 'no facility has yet demonstrated net energy gain.' The document should be clearer about what has been demonstrated already and what is hoped for in term of future performance.

- The paper is correct to acknowledge the uncertainty that still remains around the overall hazard of fusion power and also its ability to generate large amounts of energy in a cost-effective way. It is important that these uncertainties and risks are properly communicated to stakeholders and potential host communities. More should be said on how this will be achieved by the Government or any developer of the technology.
- While the fusion reaction itself may be 'carbon free' it would be useful to have some explanation of the overall carbon impact of the construction, operation and dismantling of such a facility, both in terms of STEP and a large-scale fusion plant.
- It should be recognised in Table 3 that land use and waste planning, overseen by Local Planning Authorities (LPAs) is part of the regulatory regime for any new fusion development. There is an acknowledgement of the role of the planning system within Figure 14 and so there needs to be consistency in approach.
- We note that the report of the Regulatory Horizons Council (RHC), on which the Government draws heavily, did not engage with anyone involved in the planning regime. We are disappointed by this given the significance of planning to fusion regulation.

### 3. Comments on specific questions

**Question 2: Do you agree with the Government's conclusions regarding the expected hazards of future fusion power plants? Please provide as much evidence as possible to support your view.**

The explanation of hazards provided is concise, relatively clear and accessible to those with more limited technical knowledge. It is helpful to have the likelihood and potential individual impact of a range of worst-case scenarios quantified and set out in a table.

**Question 3: Do you agree with the proposal to maintain the existing regulatory approach? Please explain your response.**

Fusion is a technology that is not mature and which is anticipated to evolve significantly in the future.

We do not have a view as to whether the proposed regulatory approach, or an alternative approach that delivers regulation through NIA65, is preferable. The focus



should be on ensuring that the regulatory regime at any given time delivers the optimal outcomes in terms of worker and community safety, security and environmental protection.

Regulation of fusion should therefore be subject to regular and rigorous re-assessment. We support the proposal that regulation should be reviewed *at least* every 10 years but believe that intervals between reviews should be pegged to progress with and learning from design and deployment. The view of host communities and stakeholders should be used to help guide the review process.

**Question 6: What are your views on the Government's proposals in relation to the regulatory justification of fusion?**

We agree with these proposals. The STEP reactor will generate a modest amount of net energy which might not be in the form of electricity but could be, for example, hydrogen production. We agree with the proposal that waste arisings should also be part of the consideration as to whether the development is justified.

**Question 8: Do you agree with the proposal to establish a Fusion NPS based on the planning assumptions outlined above? Please explain your response.**

Yes. We support the establishment of a Fusion NPS given the complexity of the development.

**Question 9: What other issues should a Fusion NPS address?**

We believe it should also address the socio-economic impacts of a fusion development and set out criteria for community benefits to be provided to the host community. It should also explain how engagement between the site and the local community should be supported. For operational fission plants this is through a Local Liaison Committee.

**Question 23: What are your views on how radioactive waste from fusion should be safely and sustainably managed?**

We support the engagement with the Committee on Radioactive Waste Management (CoRWM) that is being undertaken and have read with interest their recent

**Preliminary Position Paper: Radioactive Wastes from Fusion Energy<sup>1</sup>.**

support the three recommendations contained in that paper:

- BEIS and CoRWM should engage to amend the CoRWM Framework Document to formalise consideration of decommissioning, radioactive waste management, radioactive waste disposal associated with fusion power.
- Following consultation with BEIS, CoRWM should provide appropriate scrutiny and advice of radioactive wastes from fusion power, through its annual work plan.
- Following conclusion of the current Green Paper consultation, CoRWM should produce a consolidated position paper on decommissioning, radioactive waste management, radioactive waste disposal associated with fusion power.

In terms of waste arisings, CoRWM's recent Preliminary Position Paper states that *'There is a need to ascertain the extent to which radioactive wastes arising from future fusion systems can be confidently expected to meet LLW criteria at 100 y after End of Life (EOL), and to understand whether any ILW can be plausibly managed in near surface disposal facilities. There is also a need for consideration of the other hazardous or non-radiological properties of the radioactive wastes from nuclear fusion, which may be the determining factor for acceptance as LLW and near surface disposal.'*

More information on the waste arisings from fusion, and their management, should therefore be provided by Government. The information on waste in this consultation document is limited and poorly presented:

- The consultation refers to UKAEA's Technology Report as providing more information on waste arisings for a TOKAMAK. However, the link provided (p.35) simply take you to the UKAEA website and not to the report, which is difficult to locate.
- The paper refers to Annex D, but this simply provides some general information about the waste hierarchy and the types of waste that have to be managed. It would be useful to have information on the likely volumes of waste arising for (a) the proposed STEP reactor and (b) and large scale (e.g. 2GW) plant and also some quantification of what 'shorter lived' means.

The consultation also notes that, while most ILW will become LLW after 100 years of decay storage, some ILW may be classed as such for thousands of years. Even if the overall amount of ILW generated will be relatively small in terms of the total ILW inventory, it still equates to thousands of tonnes that will have to be stored for at

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[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1038746/radioactive-wastes-from-fusion-energy-corwm3735-preliminary-paper.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1038746/radioactive-wastes-from-fusion-energy-corwm3735-preliminary-paper.pdf)

least a century. This has implications for the community hosting the site or waste store if that is located elsewhere.

LLW arisings can also have an impact, with this material likely to be diverted along a range of routes for management and disposal. This has a community and environmental impact.

We believe that these impacts should be recognised and a clear commitment made to the preparation of a waste management strategy for each fusion development, with a particular focus on ILW and on minimising waste arisings. We also believe that community benefits should be enshrined within any siting process for a fusion development.

**Question 24: Do you believe that Government policy should reflect an expectation that radioactive waste from fusion can be disposed in near-surface disposal facilities? Please explain your response.**

The disposal route for fusion wastes should be informed by a risk-based assessment and by the views of host communities. The disposal of some wastes in a Near Surface Disposal (NSD) facility may be appropriate, but that should be decided by the disposal authority, in discussion with regulators, as is the case with the decommissioning of former fission power stations by the NDA.

As this paper explains, a fusion plant will also generate a range of low-level waste (LLW). Such waste should again be managed through the most appropriate route. This is likely to be disposal to a surface repository, landfill or through recovery, recycling or other treatment processes. The management of these wastes is not explained clearly in this document.

Finally, we would expect more to be said on the storage of wastes. We note that CoRWM's recent Preliminary Position Paper states that in terms of tritiated wastes, there could be the need for *'very significant decay-storage capacity with a lifetime of at least 100 years.'*

**Question 25: What are your views on how a fusion facility should be decommissioned?**

We agree with the basic approach proposed. However, the section indicates that a funded plan for decommissioning will be required, as is the case with new fission plans. There is no explanation of who would be responsible for decommissioning or how this would be decided. It is not clear if the developer, another organisation or the NDA would be the lead organisation.

The decommissioning plan should ensure that the design and operation of any fusion facility is optimal in terms of minimising waste arisings and easing decommissioning.

**Question 26: How should these topics be covered in any guidance developed for the fusion regulatory framework?**

We would expect more information and more clarity on decommissioning and waste management within any fusion regulatory framework.

This paper does not address the storage of waste and this should be covered within guidance.

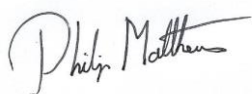
**Question 29: Do you agree with this proposed approach for keeping the fusion regulatory framework under review? Please explain your response.**

Yes. We believe it is essential that regular reviews are undertaken. As the paper acknowledges, this is a fast-moving field and a technology that is not close to reaching maturity. The commitment to reviewing the regulatory approach every 10 years as a minimum, and more frequently if developments in the design and generation of fusion facilities requires, is appropriate.

Any review should be informed by expert groups such as CoRWM but also by consultation with stakeholder groups such as Nuleaf, host communities and Local Authorities as well as the wider public.

I hope these comments are helpful.

Yours faithfully,



**Philip Matthews**  
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