The draft Merchant Shipping (Nuclear Ships) Regulations 2021 Consultation Response
05/10/21

Summary
The Nuclear Institute (NI) is the professional body and learned society for the nuclear industry. Representing over 3,000 professionals at all levels across the industry, from new build and operations to decommissioning, the NI sets the standards for nuclear professionalism.

The NI is supportive of the consultation on the draft Merchant Shipping (Nuclear Ships) Regulations 2021. Without nuclear technology, the route to Net Zero would be higher risk, more expensive and uncertain.

Nuclear technology can be used to decarbonise, heat, transport and electricity directly and through vectors such as hydrogen and synthetic fuels.

As the voice of nuclear professionals in the UK and overseas, the NI looks forward to working with HMG to realise the advancement of nuclear technology and its role in merchant shipping.

Section 5: Response form

What is your email address? policy@nuclearinst.com, chair.wales@nuclearinst.com
What is your job title? Policy Committee

When responding please state whether you are responding as an individual or representing the views of an organisation:
I am responding on behalf of an organisation
(Nuclear Institute)

Please check the box that best describes you as a respondent and the size of your organisation:
Respondent Type
Other
(Learned Society/Membership body)

Size of Organisation
Less than 10 employees, with over 3,000 professional members.

Consultation Questions
During the consultation phase for these proposed Regulations, we ask that consultees provide evidence of the costs and benefits of this policy wherever possible.

Do you think that there exists industry appetite for new nuclear ships within the appraisal period? Please detail the reasons for your answer. [The standard 10-year appraisal period has been used for the purposes of this consultation, in line with HMT's Green Book.]

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Yes. The increasing drive towards Net Zero will mean that all sectors will look to ways to decarbonise. Nuclear powered merchant ships have previously been and are currently in service as icebreakers and other vessels. There are an increasing number of vendors bringing forward proposals for so-called 'micro modular reactors' in the 5 – 50 MW range which could also be well suited to marine application.

Is the assumption that no new or existing nuclear ships will be flagged in the UK within the appraisal period of 10 years (2021 – 2030) accurate or inaccurate? If inaccurate, please detail why.

Accurate. Although it is technically feasible to flag a new nuclear merchant ship in the UK within the Appraisal Period, confidence in the regulatory and other processes will need to be demonstrated prior to such an event.

Is it accurate or inaccurate to assume operators/owners of nuclear ships would already follow the building and operating standards of the Nuclear Code in line with the international requirements by way of best practice, incurring no additional costs as a result of this legislation, apart from survey and certification? If inaccurate, what costs would be incurred? Please provide evidence where possible.

Accurate. Please see responses below.

Do you think that best practice in the construction and safety standards could potentially be at a level higher than that contained within the Nuclear Code, taking into account its age (40 years old)? Please detail the reasons for your answer.

Yes. Best practice and accepted standards are informed, in part, by lessons learned and operational experience. If the Nuclear Code is 40 years old, there is a possibility that lessons learned after 40 years of marine and nuclear deployment are not included.

Do you foresee any unintended consequences of the proposed Regulations? If so, please provide any relevant evidence.

It would be helpful to understand the nature of the regulatory process involved with respect to nuclear merchant shipping. The proposed regulations require approval for the safety of the 'reactor installation' from the Secretary of State for the Department of Transport. It would be helpful to understand the competent authority who will provide the Secretary of State with such advice. The UK Office for Nuclear Regulation (ONR), Environment Agency (EA) and the Defence Nuclear Safety Regulator (DNSR) have many years of experience of regulating land and sea based nuclear reactors. The significant number of technologies that are being developed are being matured with an aim of compliance with existing ONR guidelines for land-based reactors and there is a likelihood of cost and complexity if future regulation is not

aligned with existing requirements. Any differences in the regulatory regimes for shipping and land-based reactors will need to be examined closely for any unintended consequences.

Do you think the proposed Regulations will impact on your business – if so please summarise and provide evidence where possible?

Yes. As the recognised Institute for nuclear professionals, the NI would be keen to explore opportunities to work with policy makers and regulatory authorities with respect to merchant shipping and would expect its members to be involved in such programmes through the course of their normal employment. Developing a regulatory framework for use of nuclear propulsion in merchant applications can further support the development of the UK as a global leader in small and advanced nuclear and its related supply chain. This will likely incentivise inward investment and growth of the sector.

Do you anticipate any practical difficulties in meeting the survey and inspection regime contained in the proposed Regulations? Please provide any evidence to support your answer.

No.

Are there any costs or benefits which need to be considered?

Yes. With respect to costs, the costs of regulation and the cost recovery mechanism should be carefully considered. Benefits related to the fact that nuclear propulsion produces no greenhouse or acidifying pollutant gases should also be considered in addition to the potential economic benefit to UK ports and maritime areas.

We welcome your views and evidence on costs or benefits and any other aspects of this consultation.

- The NI agree that the exact form of nuclear contribution to merchant shipping is unclear. Hydrogen, ammonia or synthetic fuels created from the capture of atmospheric carbon dioxide and produced using nuclear or renewable power can also provide a net zero pathway to decarbonising merchant shipping,
- Nuclear power has and can provide merchant ships with a reliable power source, increasing endurance, range and speed,
- NI does not agree with section 2.5 of the consultation “However, due to the high costs of nuclear power and its unique features, it is not expected to be widely rolled out for traditional shipping and is not listed in the UK Clean Maritime Plan”. Analysis has shown that realisation of the fleet effect; building one design multiple times,

substantially reduces costs. For example, land-based reactor systems are aiming to achieve £35 - £60/MWh.

- The 1960 Energy White Paper described a cost reduction of 55 % across the Magnox fleet of nuclear reactors and the ETI Cost Drivers analysis showed that had a follow-on dual unit been built after Sizewell B, the costs of the second plant would have been half the original. Amortising the design, regulation and testing costs over multiple units make the costs of resultant units cheaper and this would be expected in a nuclear reactor build programme for merchant shipping with power units suited to factory build and modularisation programmes which are rapidly advancing in the sector,
- The creation of a market in nuclear merchant ships has very close synergy with capability and skills in the land based large, Small Modular Reactor (SMR) and Advanced Modular Reactor (AMR) programmes identified in the Prime Minister's 10 Point Plan for a Green Industrial Revolution. Such a market can gain efficiencies and further cost reductions through these synergies and can boost manufacturing and jobs in those areas of the country that require investment; contributing to the Government's 'levelling up' campaign and post COVID recovery,
- The UK's knowledge and expertise in regulation, operation, safety cases and maritime history can make it a world leader in nuclear merchant shipping.