Office for Nuclear Regulation - Submission to Energy and Climate Change Committee on Small Nuclear

Background

1. The Office for Nuclear Regulation was established as an independent regulator on 1 April 2014, and our mission is to ensure that the nuclear operators keep their facilities safe and secure, and to hold them to account on behalf of the public. As such, we have no position on what types of reactors are built in the UK, as long as these meet the safety and security standards that are required by law.

Regulatory assessment

2. Anyone wishing to build and operate a nuclear reactor of any scale in the UK would be subject to the same safety standards. The law requires risks to be reduced so far as is reasonably practicable (SFAIRP), whether from a small or a large reactor. ONR assesses a developer's safety arguments (its 'safety case') to test whether this requirement is met; without which the construction of a proposed nuclear facility cannot be licensed to proceed.

3. The more novel a small reactor design (for instance molten salt or one using thorium), the more challenging it will be for the developer to gather sufficient evidence, from research and development work, to demonstrate that all aspects of the design that affect its safety and security will meet regulatory requirements. For reactors which are smaller versions of established reactor types, it may be easier to draw on operational experience with existing power stations to support the safety of the proposed design.

4. A safety case for a small reactor will not necessarily be shorter or simpler than for a large reactor. ONR would anticipate that taking a small reactor of novel design through a Generic Design Assessment process would take a similar time to that taken to assess an evolutionary design of a large reactor. This could be around 4 years depending on resource availability with an additional two or more years to review a subsequent site-specific licence application.

5. As happens currently, ONR would expect any request to carry out a design assessment of a small reactor to come from the Department of Energy and Climate Change. This ensures that the possible deployment of such a reactor would be consistent with Government energy policy and helps to avoid nugatory work by both ONR and the intending developer.

Expertise

6. Apart from early experimental reactors developed mainly in the USA, there has been limited world-wide experience with small reactors; more recently there has been very little operational experience. As a consequence there is likely to be only a limited amount of international expertise available to be called upon if such types of reactor were proposed for the UK.

7. ONR's in-house knowledge and expertise relating to large power reactors is considerable, and much of that would be transferable to small reactor designs. However, particularly for novel designs, it is likely that additional resource would be needed, either through recruitment or by using specialist contractors. Contracting out work that would ordinarily be undertaken by ONR's specialist regulators carries with it a significant in-house overhead due to the need for ONR to be an intelligent customer for the work.

8. If a small reactor design was proposed for deployment in more than one country, then the design might be brought within the purview of the Multi-national Design Evaluation Programme (MDEP) which is an international grouping of regulators set up to share knowledge and experience of design assessments. ONR is a member of MDEP and currently chairs the sub-grouping of regulators looking at the Advanced Boiling Water Reactor design.

9. In terms of emergency planning – ONR would again expect the operator of such a site to meet modern emergency planning standards. Some small reactor designers claim that the risk of a radiological release is so low that no off-site emergency plan will be required. ONR would look closely at the reasoning behind such claims.

Anticipated industry and infrastructure requirements

10. We expect that any operator wishing to put a small nuclear unit into operation in the UK would still be a large company – the organisational structure and management systems that would be needed to demonstrate the safe operation of even a small nuclear reactor in the UK would require significant resource.

11. Finding suitable sites for small reactors is likely to be easier than for large reactors as, for instance, there would be less onerous demands for cooling water, and grid connections for existing conventional power stations may be adequate. This is dependent on whether multiple units would be needed on a site to make its operation commercially viable, and the strength of public opinion on the use of a wider number of sites.

12. The Government currently has a policy in place for siting of large nuclear power stations and it is likely that this would need to be adapted to deal with smaller units. ONR's interest in siting would be largely limited to those aspects which could affect safety – for instance the local seismicity and the underlying geology. In addition, ONR would need to consider safety and security concerns in relation to the transport of radioactive materials and the location of the site as part of its wider assessment.

13. Any station proposing to generate greater than 50MW would be considered a major infrastructure project, and would need to have the requisite planning arrangements, including public engagement. As with any new nuclear project, ONR would be open and transparent with the public, taking into account their views and concerns and keeping them informed on the progress of our assessments.

14. In the event that plants were set up in the UK for producing some or all of the parts for small modular reactors, ONR would have a role in on-site inspection of the licensee's control of the manufacturing processes and in particular the quality

assurance arrangements. However, the greater part of the conventional manufacturing aspects of such plants would be overseen by other regulators. There would therefore need to be close liaison in this area. ONR would regulate any UK plants producing or handling new nuclear fuel through the nuclear site licensing regime.

Conclusion

15. ONR expects any approach to assess the safety and security of a small reactor to be initiated by Government, after which the design would be expected to meet the same safety standards as current designs with larger megawatt capacity.

16. Whilst expertise in this field is understandably scarcer, we believe that it would be possible to adequately assess a new design and grant a licence within around six years from the point of first request, dependent on the quality of the research and information provided by the applicant.