



ONR/NGO Forum – 28 March 2019	
Title	Briefing Paper on coastal nuclear infrastructure and rising sea levels
From	Professional Lead, Civil Engineering and External Hazards
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## 1 Purpose

- 1.1 This paper is to update members of the ONR NGO forum on coastal nuclear infrastructure and rising sea levels. It has been prepared in response to four questions received by the Forum, via the co-chair (Dr Jill Sutcliffe).

## 2 Questions and Answers

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Q1 *The Development Consent Order for HPC which was based on a build designed prior to our current understanding of the speeding up and unpredictable nature of Climate Change and how it appears to be unfolding.*

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- 2.1 Climate change is a rapidly evolving area of scientific research, and our understanding of it is constantly changing. Applicants seeking a Development Consent Order (DCO) therefore need to demonstrate that future adaptation and flood mitigation would be achievable at the site, after any power station is built, to allow for any future credible predictions that might arise during the life of the station and the interim spent fuel stores.
- 2.2 ONR is a statutory consultee on all new nuclear build applications for DCOs made to the Planning Inspectorate (PINS). As such, ONR has reviewed and assessed the adequacy of the licensee's nuclear safety arrangements in relation to flooding and climate change. Given the potentially significant risks that climate change presents and the significant uncertainty over the very long life of nuclear sites, HPC has needed to include precautionary elements within its initial design, along with flexibility designed into flood measures. Specialist inspectors within ONR have judged that HPC's DCO application has included adequate flexibility to account for future changes to our understanding of climate change.
- 2.3 ONR guidance reflects Government policy on adapting infrastructure to climate change, set out in its vision "An infrastructure network that is resilient to today's natural hazards and prepared for the future changing climate" [Ref. A].

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*Q2 The measures that the ONR have taken, in the light of the Climate Change situation to ensure that NNB GenCo have made the necessary modifications to comply with the ONR's Technical Assessment Guidance (TAG) on External Hazards Appendix 1 Fukushima.*

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- 2.4 ONR's Safety Assessment Principles (SAPs) were updated in 2014 to incorporate our expectations based on lessons learned post-Fukushima, as set out in the Technical Assessment Guidance (TAG) on External Hazards, Appendix 1 - Fukushima. HPC's safety case has been assessed against these expectations.
- 2.5 As an example, the SAPs have been updated post-Fukushima to state that "[where practicable] facilities should be protected against a design basis flood by adopting a layout based on maintaining the 'dry site concept'. In the dry site concept, all vulnerable structures, systems and components should be located above the level of the design basis flood together with an appropriate margin..." It should be noted that HPC does comply with the definition of a dry site.

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*Q3 The measures that the ONR has taken to correct the gaps in its TAG in relation to coastal management/flooding as identified by its Expert Panel on Natural Hazards.*

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- 2.6 In 2018 ONR updated our External Hazards Technical Assessment Guide (TAG 13), a detailed document that covers seismic events, coastal flooding, meteorological hazards, and more. TAG 13 consolidates lessons learned from the events at Fukushima in 2011 and was a collaboration with other regulators, licensees and technical consultants.
- 2.7 The ONR expert panel on Natural Hazards (Sub-Panel on Meteorological and Coastal Flood Hazards) meets approximately annually. Its advice on meteorological hazards and coastal flood hazards has been collated into two Expert Panel Papers, which are [published on our website](#). These papers provide the expert advice underpinning the guidance to ONR Inspectors contained in the updated External Hazards TAG. Expert panel members have also reviewed the TAG annexes as relevant to their specialisms. Their comments and advice have been incorporated into the latest TAG revision.

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*Q4 The ONR's recent decision to give permission for the HPC reactor platform to be built at a height which is based on the 2009 Development Consent Order.*

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- 2.8 ONR granted consent for NNB GenCo (HPC) to commence the unit 1 Nuclear Island concrete pour at Hinley Point C in November 2018. NNB GenCo is the holder of a nuclear site licence for HPC, which ONR granted in November 2012. The platform level for Hinkley Point C has been assessed as part of both the granting of the site licence and the consent to commence Nuclear Island concrete pour. The ONR assessments have confirmed the designation

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of HPC as a “dry site” in accordance with the International Atomic Energy Agency (IAEA) definition. This is based upon the platform height and potential for sea flooding, including sea level rise as a result of reasonably foreseeable climate change.

- 2.9 The basis for designating the site as a “dry site” will be monitored through the life of the power station through periodic review of the safety case. Should the assumptions for sea level be shown to no longer be valid, NNB GenCo would have to maintain the safety of Hinkley Point C against sea flooding. This could include the deployment of the managed adaptive measures identified in the design. This approach is in accordance with both ONR SAPs and the joint ONR and Environment Agency Principles for Flood and Coastal Erosion Risk Management [Ref. B].
- 2.10 At this time the assumptions for sea level rise resulting from reasonably foreseeable climate change for the Hinkley Point C site remain valid. The ONR was able to provide consent for the Nuclear Island concrete pour as NNB GenCo have shown that the risk from sea flooding has been reduced so far as reasonably practicable.

### References

- A. Climate resilient infrastructure – preparing for a changing climate:  
<https://www.gov.uk/government/publications/climate-resilient-infrastructure-preparing-for-a-changing-climate-summary-document>
- B. Principles for Flood and Coastal Erosion Risk Management:  
<http://www.onr.org.uk/documents/2017/principles-for-flood-and-coastal-erosion-risk-management.pdf>