



Hinkley Point C

Appropriate Assessment for related
Environment Agency permissions
(Habitats Regulations Assessment)

Executive Summary

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Published by:

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Executive summary

We carried out an Appropriate Assessment (AA) for the relevant Environment Agency permissions needed to build and operate the proposed Hinkley Point C (HPC) development. These include water discharge and combustion activities, radioactive substances and flood defence consents.

The AA assesses the potential impact of our permissions on achieving the conservation objectives for both the Severn Estuary and the Exmoor Quantock Oakwoods Natura 2000 sites, as determined by both Natural England and the Countryside Council for Wales (2009)¹, (date unknown)².

The main part of the assessment was concerned with the water discharge activities and their potential effects on the Severn Estuary Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar sites, as the proposed HPC site is directly next to and partly within these designated sites.

A number of the conclusions from the assessment involve implementing measures and conditions that are beyond our control. In these cases, the conclusions will only be valid if the appropriate competent authority puts these measures and conditions in place, or if the potentially damaging effects identified in the assessment are addressed in another way.

We carried out desk-based research of scientific papers including information from technical reports written by the Centre for Environment, Fisheries & Aquaculture Science (Cefas) on behalf of Électricité de France (EDF) and Nuclear New Build Generation Company (NNB GenCo).

Because of the complex nature of the Severn Estuary sites and the need to make assumptions about precise biological responses to environmental change, we also used expert judgement to reach our conclusions about effects and impacts.

The data, assumptions and approach we used in reaching our conclusions have been internally and externally peer-reviewed and endorsed by national experts with particular knowledge of the Severn Estuary.

The main areas of potential concern we focused on included toxic contamination, thermal impacts, entrainment and impingement of fish and planktonic organisms, and disturbance to birds. These were all assessed in respect of the HPC project itself and the combined impact of the HPC project with other on-going activities and planned projects in the area.

The conclusions below reflect our findings for the Severn Estuary Natura 2000 sites and also cover any potential impacts on associated sites: River Usk/Afon Wysg SAC; River Wye/Afon Gwy SAC; River Tywi/Afon Tywi SAC. We concluded that there was no adverse effect on the integrity of the Exmoor Quantock Oakwoods SAC.

1 Natural England (NE) & Countryside Council for Wales (CCW)' advice given under Regulation 33(2)(a) of the Conservation (Natural Habitats, &c.) Regulations 1994, as amended. Severn Estuary/Môr Hafren European Marine Site. June 2009

2 Exmoor and Quantock Oakwoods Special Area for Conservation. Natural England' advice given under Regulation 33(2)(a) of the Conservation (Natural Habitats, &c.) Regulations 1994, as amended.

Toxic contamination

Total residual oxidant (TRO) and hydrazine in the operational discharges were above the relevant standard within the cooling water. We did not consider the resultant mixing zone for TRO to be significant, as it was restricted to small areas around the outfall diffusers. However, the maximum load for hydrazine and the potential mixing zone for this maximum load were potentially significant. For this reason, we could not rule out the potential for an adverse effect on the integrity of the Severn Estuary SAC due to the discharge of hydrazine. Therefore, the environmental permit for the operational discharges will require that hydrazine is removed from the relevant waste streams before discharge.

We concluded that the levels of all other toxic contaminants in the operational discharges from HPC would not have an adverse effect on site integrity of the SAC.

Thermal impacts

The main effect of the thermal plume from HPC on the features of the Severn Estuary SAC is the potential impact of increased water temperatures on the subtidal and intertidal benthic species, and, in particular, the bivalve *Macoma balthica*. This bivalve provides the greatest source of food in the subtidal and intertidal areas. It is also considered to be the species most at risk from increases in the temperature of seawater.

However, evidence on *Macoma balthica* and other benthic invertebrates within the mudflat area of Stert flats that are affected by the existing thermal plume from Hinkley Point B (HPB) show they are no different from those found outside the thermal plume.

This evidence supports the view that the thermal plume from HPC would have no significant effect on intertidal benthic invertebrate species. The subtidal benthic invertebrate species tends to be very limited, and is only affected by water temperatures higher than those on the intertidal area immediately near the outfall diffusers. These factors, together with the lack of any significant effect from the increased water temperatures on the intertidal mudflat area, indicate that any effect on the subtidal benthic invertebrate community will also not be significant.

We have, therefore, concluded that temperature changes due to the operational discharges from HPC would not have an adverse effect on site integrity.

Entrainment and impingement of fish and planktonic organisms

The preventative measures proposed for HPC included a low velocity intake design, acoustic fish deterrent (AFD) system and a fish recovery and return (FRR) system. We took these measures into account when calculating impingement losses from HPC. These were predicted to be similar to or less than those of the existing HPB station.

Based on the information provided in EDF's report to support the HRA, supporting technical documents and our assessments, we conclude that the predicted rates of fish impingement and entrainment at HPC should not adversely affect either the protected species, estuarine assemblage or integrity of the site.

However, given the many different factors influencing impingement and entrainment within the Severn Estuary/Bristol Channel and the reliance on the proposed preventative measures, there is still scope for potential improvements to systems to improve the predicted rates and, in turn, protect more fish.

We, therefore, consider it extremely important that the final designs of both the FRR and AFD are tested well in advance of the operation of HPC, preferably at the

commissioning stage, to give enough time to reach maximum performance before operation begins.

We have advised the competent authorities (Infrastructure Planning Committee (IPC) and Marine Management Organisation (MMO)) that a comprehensive ecological monitoring and contingency plan should be developed before any water is abstracted. This would identify the measures needed to detect early and prevent any changes that may lead to environmental or ecological harm.

Disturbance to birds

The main disturbance issues are predicted to be caused by the construction of Comwich Wharf as part of the flood defence consent activity. We concluded that the Parrett Estuary next to Comwich Wharf, which is part of the Severn Estuary SAC/SPA/Ramsar, remains an important site for birds.

The data indicated that there are large numbers of birds within 250m of the wharf construction area, including three SPA qualifying species (gadwall, redshank and curlew) and three SPA listed species (wigeon, mallard and lapwing). There are also significant numbers of SPA birds in Comwich Brickpits County Wildlife Site next to Comwich Wharf, which were not included within the counts. This meant that the bird counts did not represent total counts for the whole river area. On the basis of the information provided, we were unable to conclude that there would be no adverse effect on the integrity of the site without taking preventative measures.

As it was not appropriate to implement these measures via the flood defence consenting process, we have strongly advised the competent authorities (local planning authority (LPA) and Marine Management Organisation (MMO)) to make sure that further preventative measures are incorporated into the project to protect migratory birds and bird assemblage. These measures include:

- confining piling work between April and September to avoid the winter months when birds are feeding on exposed mudflats;
- stopping construction in the event of severe winter weather leading to voluntary wildfowling restraint by the British Association for Shooting and Conservation (BASC) (after seven days of freezing conditions); developing a scheme for piling works before construction.

In combination effects

The main concerns from both the combined effects of all the activities within the HPC project and also those combined with all other current activities and planned future projects in the area (in-combination assessment) were the combined HPC construction activities and the effects of the overlap period between HPC and HPB. As with the assessment of the impacts of the activities within our permissions in isolation ('alone' assessment), the main areas of potential concern we focused on were toxic contamination, thermal impacts, entrainment and impingement of fish and planktonic organisms. The main impacts to birds were considered to be from impact of water temperature increases on their food source within the intertidal and subtidal mudflats.

A major factor in assessing the in combination effects for the thermal discharges was the close proximity of the HPB discharge to the proposed cooling water discharge from HPC. As discussed in the alone assessment, the species most likely to be affected by the potential rise in water temperature from the combined thermal plumes from HPB and HPC is the Baltic tellin, *Macoma balthica*. However, using desk-based studies, together with comparative studies from the Gironde Estuary in France and historical data from Hinkley Point A, we have concluded that the combined thermal plume from HPB and HPC that will exist until 2023 will not compromise the conservation objectives and, therefore, will not have an adverse effect on site integrity.

We also considered the thermal effects of fish in combination in relation to direct effects and effects of thermal occlusion. Neither were considered to significantly impact on the migratory fish or fish assemblage features of the Severn Estuary SAC and Ramsar.

The in combination effects of the chemical discharges focused on the discharge of TRO from HPB and HPC, together with the discharge of hydrazine just from HPC, as HPB does not have a permit to discharge hydrazine. As with the assessment of HPC on its own, it was not possible from the information available to conclude that the discharge of hydrazine does not have an adverse effect on the integrity of the site.

We assessed the cumulative effects of impingement and entrainment together with the in combination effects of HPB and HPC. The species that required detailed investigation included the brown shrimp, *Crangon crangon*, whiting, *Merlangius merlangus*, sprat, *Sprattus sprattus* and cod, *Gadus morhua*. Extensive desk-based studies, compared with the International Council for the Exploration of the Sea (ICES) sector allocations for this area of the Severn Estuary have shown the impacts of HPC and HPB will not have a significant effect on the species during the timeframe considered. Although, it should be noted that if the operation of HPB has to be extended further beyond 2023, then another Habitats Regulations Assessment will be needed.

There were minor in combination effects for both the Bristol Port and Environment Agency Steart Peninsula Projects and the combined construction activities.

Conclusion

This assessment has considered all relevant factors and undergone an internal peer review, as well as consultation with Natural England and Countryside Commission for Wales. As the competent authority for permits associated with this proposed site, we have concluded that:

- The maximum load for hydrazine and the potential mixing zone could potentially have a significant impact on the features of the site. Removing hydrazine from the relevant waste streams before discharge will eliminate this risk.
- Temperature increases from the discharge of cooling water create a plume of water with an increase in temperature, particularly when HPB and HPC are run at the same time. The Baltic clam, *Macoma balthica* in particular, and other benthic invertebrates found in the mudflat areas of Stert flats are the most vulnerable species. Evidence based on modelling, research into similar sites and the response of the species in the existing plume from HPB alone indicates that there would be no significant effect on these intertidal invertebrate species.
- With the site operating alone with the preventative measures of a fish recovery and return system, and an acoustic deterrent system in the design of the intake for the proposed HPC site in place, we believe that there will be no adverse effect on fish. However, given the complex nature of the estuary and the reliance on these proposed measures, the final designs should be tested at the commissioning stage of the set up, well in advance of the full operation of HPC to allow maximum performance.
- We were unable to conclude there would be no adverse effect on the birds listed in the European site designation due to disturbance (noise and visual) at the construction stage of the Combwich Wharf. To ensure migratory birds are protected, we have strongly advised the competent authorities to implement measures related to the timing of piling work and to stop work if there is severe winter weather.

The technical sections of the appropriate assessment include detailed evidence and our reasons for the conclusions above.

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