HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

7.1 Electricity Grid Connection Statement

PINS Reference Number: EN010007

Application Reference Number: 7.1

June 2018

Revision 1.0

Regulation Number: 5(2)(p)

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Horizon Internal DCRM Number: WN0902-HZCON-PAC-REP-00006_English

[This page is intentionally blank]

Contents

List of Figures

[This page is intentionally blank]

Executive Summary

Regulation 6(1)(a)(i) of The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 requires an application for an order granting development consent for the construction of a generating station to be accompanied by a statement of who will be responsible for designing and building the connection to the electricity grid. This document is the Grid Connection Statement for the Wylfa Newydd Project.

National Grid Electricity Transmission plc (NG) and Horizon Nuclear Power Wylfa Ltd (Horizon) entered into a Bilateral Connection Agreement and a Construction Agreement on 23 December 2008 (Reference A/NP/08/1-96EN(3)), together referred to as the 'Wylfa Connection Agreements'. These agreements set out the works that will be required to connect the Power Station to the national electricity transmission system (NETS).

The Wylfa Connection Agreements set out the responsibilities for both NG and Horizon for designing, consenting and building the Power Station's connection to the NETS and the associated transmission reinforcement. NG is responsible for designing, gaining consent and building the transmission reinforcement works in its role as statutory undertaker for electrical infrastructure in the area. Horizon is responsible for designing, gaining consent and building the connection between the Power Station and the existing Wylfa 400kV sub-station that formerly connected the Existing Power Station to the NETS.

1 The Wylfa Newydd Project

1.1.1 Horizon is proposing to construct and operate the Wylfa Newydd Project, which comprises the Wylfa Newydd DCO Project, the Licensable Marine Activities and the Enabling Works. Each of these elements is described further below. The Wylfa Newydd DCO Project will be consented under a Development Consent Order (DCO) and the Licensable Marine Activities will be consented under a Marine Licence. There is some overlap between the two; the Marine Works (see below) will be consented under both the DCO and the Marine Licence.

Wylfa Newydd DCO Project

1.1.2 The Wylfa Newydd DCO Project comprises those parts of the Wylfa Newydd Project which are to be consented by a DCO, namely:

The Nationally Significant Infrastructure Project (NSIP)

- Power Station: the proposed new nuclear power station at Wylfa, including two UK Advanced Boiling Water Reactors, the Cooling Water System, supporting facilities, buildings, plant and structures, radioactive waste and spent fuel storage buildings and the Grid Connection;
- other on-site development: including landscape works and planting, drainage, surface water management systems, public access works including temporary and permanent closures and diversions of public rights of way, new Power Station Access Road and internal site roads, car parking, construction works and activities including construction compounds and temporary parking areas, laydown areas, working areas and temporary works and structures, temporary construction viewing area, diversion of utilities, perimeter and construction fencing, and electricity connections;
- Marine Works comprising:
  - Permanent Marine Works: the Cooling Water System, the Marine Off-loading Facility, breakwater structures, shore protection works, surface water drainage outfalls, waste water effluent outfall (and associated drainage of surface water and waste water effluent to the sea), fish recovery and return system, fish deterrent system, navigation aids and Dredging;
  - Temporary Marine Works: temporary cofferdams, a temporary access ramp, temporary navigation aids, temporary outfalls and a temporary barge berth;
- Off-site Power Station Facilities: comprising the Alternative Emergency Control Centre (AECC), Environmental Survey

Laboratory (ESL) and a Mobile Emergency Equipment Garage (MEEG);

Associated Development

- the Site Campus within the Wylfa Newydd Development Area;
- temporary Park and Ride facility at Dalar Hir for construction workers (Park and Ride);
- temporary Logistics Centre at Parc Cybi (Logistics Centre);
- the A5025 Off-line Highway Improvements;
- Wetland habitat creation and enhancement works as compensation for any potential impacts on the Tre'r Gof Site of Special Scientific Interest (SSSI) at the following sites:
  - Tŷ Du;
  - Cors Gwawr;
  - Cae Canol-dydd

1.1.3 The following terms are used when describing the geographical areas related to the Wylfa Newydd DCO Project and the Licensable Marine Activities:

- Power Station Site – the indicative areas of land and sea within which the majority of the permanent Power Station, Marine Works and other on-site development would be situated; and
- Wylfa Newydd Development Area – the indicative areas of land and sea including the Power Station Site and the surrounding areas that would be used for the construction and operation of the Power Station, the Marine Works, the Site Campus and other on-site development (WNDA Development).

Licensable Marine Activities

1.1.4 The Licensable Marine Activities comprise the Marine Works and the disposal of material from Dredging at the Disposal Site.

Enabling Works

1.1.5 The Enabling Works comprise the Site Preparation and Clearance Proposals (SPC Proposals) and the A5025 On-line Highway Improvements.

1.1.6 Horizon has submitted applications for planning permission for the Enabling Works under the Town and Country Planning Act 1990 to the Isle of Anglesey County Council (IACC).

1.1.7 In order to maintain flexibility in the consenting process for the Wylfa Newydd DCO Project, the SPC Proposals have also been included in the DCO application. The A5025 On-line Highway Improvements are not part of the DCO application.

2 The Wylfa Connection Agreements

2.1.1 On 23 December 2008, NG and RWE Npower PLC entered into the Wylfa Connection Agreements. These agreements were novated from RWE Npower PLC to Horizon on 9 December 2011.

2.1.2 The Wylfa Connection Agreements form the contractual basis for the connection of the Power Station to the NETS, and currently provides for connection with a transmission entry capacity of 1400MW in 2024 and an additional 1400MW in 2025, giving a contracted Power Station Net Power output of 2800MW. Net Power is the power that is exported to National Grid via the Wylfa 400kV sub-station. The Net Power is less than Gross Power, as some power is consumed by the Power Station auxiliary equipment.

2.1.3 Following an exercise to optimise design and efficiency aspects of design development of the Power Station, including the turbine island, the output of the generating units has been increased, resulting in the need to modify the Wylfa Connection Agreements to align with the Power Station Net Power output. Consequently, Horizon has recently submitted an application to modify the agreement to request a new value of 1470MW TEC per unit giving a revised Power Station Net Power output of 2,940MW. In requesting a revised Station TEC of 2940MW, discussions have been held with NG to establish both a Power Station Net Power which adequate allowances for Gross and works power, and that can be accommodated by the Transmission System in North Wales.

2.1.4 The draft Order seeks consent for a Gross Power of up to 3,100MW. The final design of the Power Station in accordance with the parameters, and hence the actual Gross Power output, will be defined and approved post-consent and secured through a Requirement in the draft Order (Application Reference 3.1).

3 Horizon responsibilities: Grid Connection

3.1.1 Under the Wylfa Connection Agreements, Horizon is responsible for designing, gaining consent and building the Grid Connection, which comprises works required to connect the Power Station to the NG sub-station. These works are described further below.

3.2 Power Station

3.2.1 The Power Station would comprise of two UK Advanced Boiling Water Reactors, each capable of producing approximately 4000MW of thermal power and up to 1550MW of generated electricity. Steam from the reactor would be used to power a single turbine rotating at 1,500rpm, before being condensed and returned to the reactor via a series of pumps. Sea water would be circulated from the Irish Sea through condensers beneath the main low pressured turbines to condense the steam from the turbine. The turbine would be directly connected to a three-phase electrical generator which generates electricity at 27kV. A step-up transformer, called the generator transformer, would be located close to the turbine building and would be used to increase the voltage from the generator voltage to the 400kV transmission voltage to allow export to the NETS.

3.3 Grid Connection

3.3.1 The main export connection would connect the generator transformer to the bus-bars within the NG sub-station. Connections would also be made from the auxiliary standby transformers to the bus-bars within the NG sub-station. These connections act as a back-up to the main export connection in order to supply the auxiliary systems of the Power Station in both planned and unplanned situations.

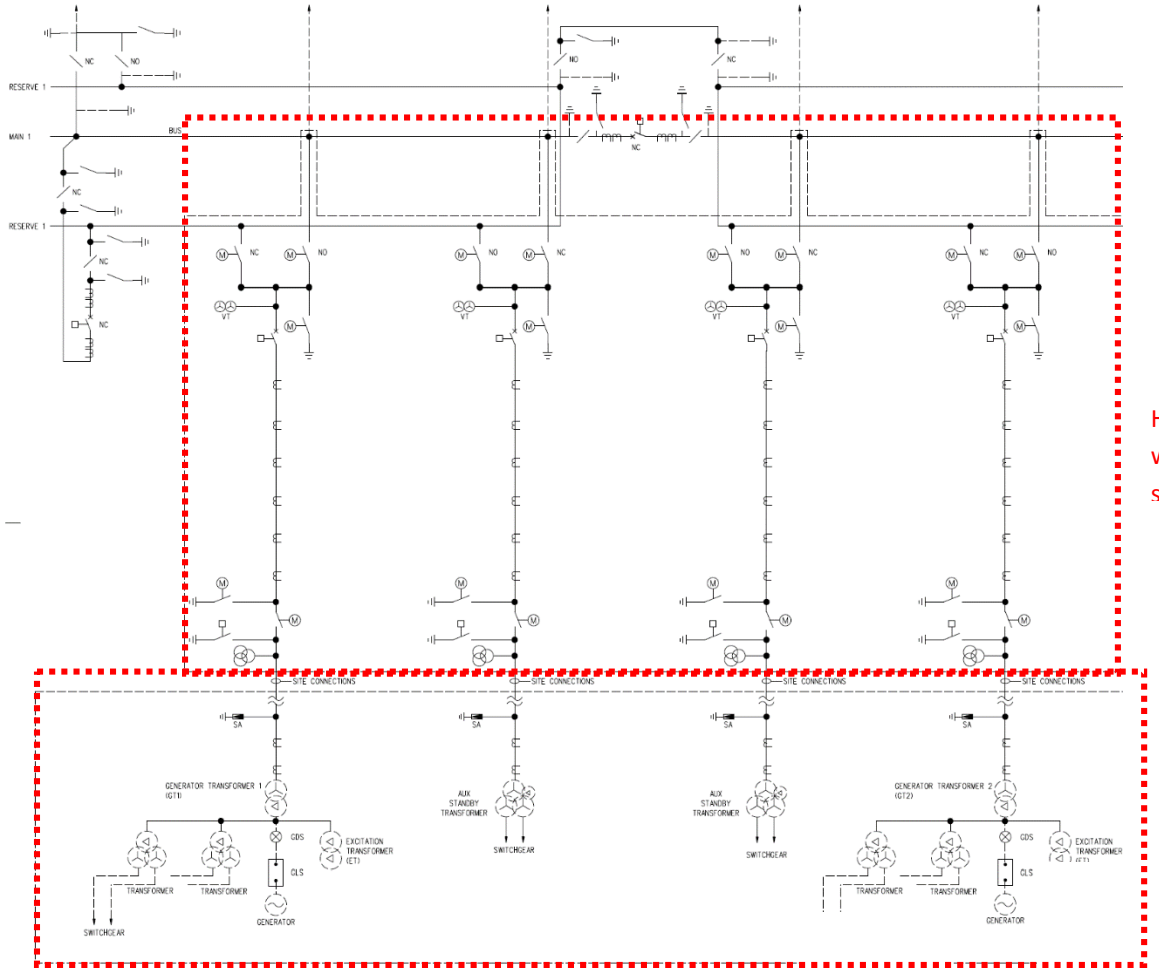
3.3.2 Within the NG sub-station, equipment would be installed to terminate the connection onto the NG infrastructure. This equipment would include circuit breakers, earth switches, disconnectors and instrument transformers and their associated support structures. Control, metering and protection systems would also be installed within the NG sub-station.

3.3.3 The connection arrangements are shown schematically in Figure 3-1. The agreed termination point between Horizon infrastructure and NG infrastructure is defined in the Construction Agreement as *"the first bolted connection between the User's [Horizon's] disconnectors and The Company's [NG's] delta frames holding the main bar and reserve bar."*

3.3.4 Further details of the grid connection are contained in chapter D1 – Proposed Development of the Environmental Statement (Application Reference Number: 6.4.1).

[This page is intentionally blank]

Figure 3-1 Diagram of Grid Connection Scope of Supply



[This page is intentionally blank]

4 National Grid responsibilities: reinforcement works

4.1.1 NG owns and operates the NETS in England and Wales. As the NETS operator, NG has a statutory duty under section 9(1)(a) of the Electricity Act 1989 to develop and maintain an efficient, co-ordinated and economical system. If a generator wishes to connect directly to the NETS, the generator is responsible for submitting an application to NG to secure this connection. NG is required to make a connection offer to the generator on the basis of this application. The responsibilities of both parties are set out in the Connection and Use of System Code which both parties have to accede to before the connection agreement can be signed.

4.1.2 NG has identified the need for transmission system reinforcement works in its "Project Need Case 2016", dated October 2016. An updated version of the "Project Need Case" document will be submitted by NG as part of its DCO application. This document has assessed the current transmission system capacity against the existing and future contracted generator connections in north Wales. NG is required to assess the NETS to ensure it complies with the National Electricity Transmission System Security and Quality of Supply Standards (SQSS). The Project Need Case states that the transmission system in the Anglesey and north Wales area would not be compliant with the SQSS after the connection of the Power Station and hence requires reinforcement.

4.1.3 Under the Wylfa Connection Agreements, NG is responsible for designing, gaining consent and building the reinforcement works required to facilitate the connection of the Power Station. The Construction Agreement between Horizon and NG outlines the works to be undertaken by each party and the prospective dates by when these works are required to be completed. The reinforcement works for which NG is responsible are outlined in appendix H of the Construction Agreement and are summarised below. Figure 4-1 shows the new assets which would be constructed as part of the reinforcement works and Figure 4-2 shows the geographical arrangement of the North Wales Transmission System, including the sub-stations referred to below.

4.1.4 The reinforcement works comprise:

- establishment of a new 400kV double circuit between the Wylfa and Pentir sub-stations;
- Re-configuring of the Wylfa sub-station
- establishment of a new 400kV single circuit (on existing transmission towers) between the Pentir and Trawsfnydd sub-stations;
- extension and re-configuring of the Pentir sub-station;
- installation of a shunt reactor at the Pentir sub-station;

- reinforcement (by replacement) of cables across the Glaslyn Estuary on the Pentir-Trawsfnydd circuits;
- re-conducting a short section of 400kV circuit between the Pentir and Trawsfnydd sub-stations;
- establishing a new grid supply point at Bryncir for the distribution network operator;
- re-configuring of the Trawsfynydd sub-station; and
- installing an operational inter-tripping scheme.

4.1.5 NG will submit a DCO application for the reinforcement works, although some wider works may be consented through planning permission or as permitted development.

Figure 4-1 NG planned reinforcement works

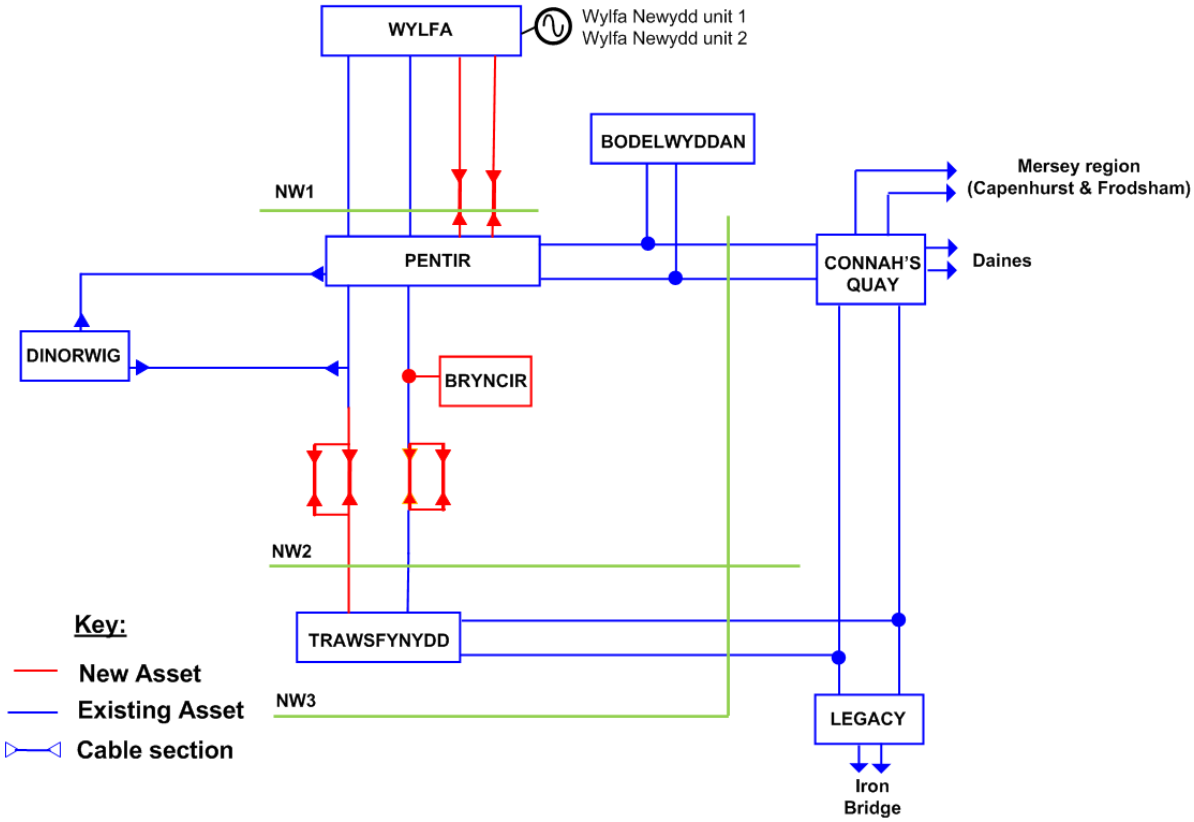
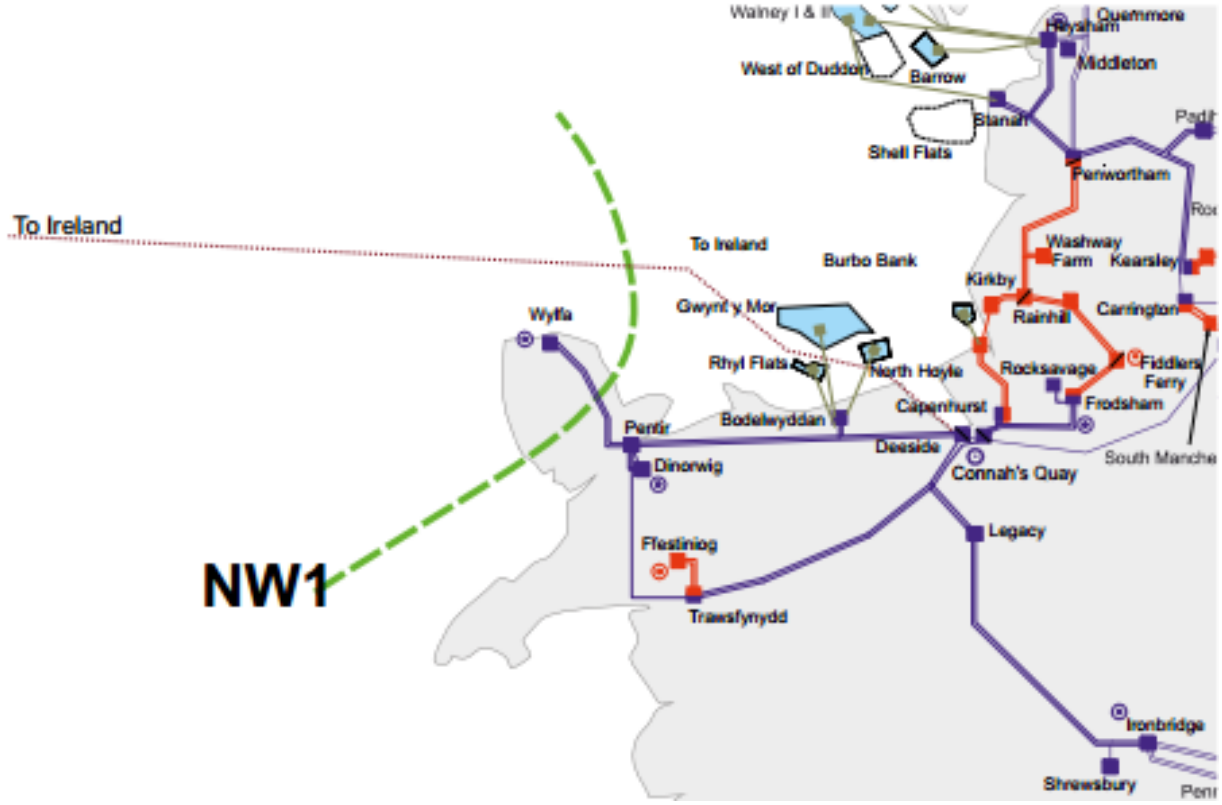


Figure 4-2 Transmission reinforcement of North Wales Transmission System



5 Conclusion

5.1.1 The Wylfa Connection Agreements provide the contractual basis for the connection of the Power Station to the NETS and clearly outline the split in responsibilities for designing, consenting and building the Grid Connection and associated transmission reinforcements between NG and Horizon. Horizon would be responsible for the Grid Connection and NG would be responsible for the reinforcement works.