

Strategic Environmental Assessment

Site Specific Baseline Wylfa

May 2010

An Environmental and Sustainability Report will be published as part of the Strategic Environmental Assessment (SEA) of the Revised NDA Strategy. It has been produced in compliance with the SEA Directive (2001/42/EC) and transposing regulations (S.I.1633, 2004).

The following pages contain specific baseline information, and maps, for the Wylfa site. This information is used in the preparation of the Environmental and Sustainability Report. A short introduction is followed by a table containing the current baseline information, organised by sustainability headings. The final section includes information about future developments and environmental issues.

The NDA is committed to openly sharing information and making it accessible to all. In making this non-confidential environmental and sustainability information available we believe that it will provide a useful ongoing resource to the general public.

Site Specific Baseline for Wylfa

Wylfa

The Wylfa nuclear power station is located on the north coast of Anglesey. The licensed site covers 21 hectares whilst the NDA's landholding is approximately 113 hectares. As of 2010, approximately 80 hectares are in the process of being sold for development as part of potential new nuclear build. Wylfa consists of two Magnox reactors, which are the largest of their type in the world. Wylfa began generating electricity in 1971 and is currently due to cease operations in 2010. Decommissioning will commence in 2011 with the de-fuelling of the reactors. Care and maintenance preparation is due to begin in 2015 and last until 2025, when the site will enter a period of care and maintenance until 2116. Final site clearance will then commence between 85 and 105 years after the cessation of generation, and is expected to last for approximately nine years. It is currently anticipated that Final site clearance will occur between 2116 and 2125.

Site End State Assumption

The preferred end state for Wylfa is for the site to be completely cleared of all buildings and structures. The area will be excavated to 1m below ground and backfilled, before being re-graded and planted to match the surrounding area. The aspired outcome is for the Wylfa site to be available and in a suitable condition for new developments to take place.

Current Environmental Baseline

Table 2: Baseline Data across all topics for Wylfa

SEA Objective	Key Environmental Baseline	Source
Air Quality	<p>Wylfa is located on the north coast of Anglesey, North Wales. The local authority recently undertook an Air Quality Progress Report for 2006/2007 which concluded that NO₂ levels were generally meeting the Welsh Assembly Government air quality standards, as were PM₁₀ concentrations. A number of exceedences of the 15 minute SO₂ objective at Penrhos Nature Reserve (11km from Wylfa) occurred as a result of operations at Anglesey Aluminium Metals Ltd. However it must be noted that the number of exceeded days remained significantly less than the 35 permitted by the Welsh Assembly Government</p> <p>The Radioactivity in Food and the Environment (RIFE) report highlighted that Wylfa discharged to air some 3.39 10⁻⁵ TBq of beta (4.8% of annual discharge limits), 2.63 TBq of tritium (15% of annual discharge limits), 1.49 TBq of carbon-14 (65% of annual discharge limits), 0.15 TBq of sulphur-35 (34% of the annual discharge limits), and 22 TBq of argon-41 (22% of the annual discharge limits). No alpha emitting radionuclides were emitted according to the RIFE report.</p> <p>The discharges were assessed to result in doses to the critical group (a group or representative individual who receive the largest dose from artificially produced radionuclides due to their habits, diet and where they spend their time) of less than 0.005 mSv/y, or 0.5% of the public dose limit</p>	<p>Magnox North (2008) <i>Wylfa Power Station Environmental Statement</i>; Isle of Anglesey County Council (2007) <i>Air Quality Progress Report 2006/07</i>; Environment Agency et al (2009) <i>Radioactivity in Food and the</i></p>

	(from all sources) of 1 mSv/y.	<i>Environment</i>
Climate Change and Energy	<p>The Wylfa site is located sufficiently higher than Ordnance Datum which should ensure that sea level rises associated with anticipated climate change are unlikely to affect the site.</p> <p>Incidental emissions of approximately 5,000 tonnes per annum of CO₂ occur from the reactors. In 2007, the equivalent of some 5,800 tonnes of CO₂ was emitted directly and indirectly by operations at Wylfa primarily from energy use.</p> <p>The site consumed some 1,230 GWh of electricity in 2007. In 2007 a total of 3,199 TJ of energy was consumed. However, in 2007 it generated 20,225 TJ.</p>	<p>NDA (2005) <i>EAPINS Project Questionnaire</i>; NDA (2008) <i>NSP Returns</i>; Magnox North (2008) <i>Wylfa Power Station Environmental Statement</i></p>
Biodiversity, Flora and Fauna	<p>There are a number of designated sites (e.g. SSSIs, Site of Nature Conservation Interest (SNCI), Special Protection Area (SPA), and Special Area of Conservation (SAC)) that are located in the region of the site. These include Tre'r Gof, Henborth, Llyn Llygeirian, and Cae Gwyn SSSIs, the Ynys Feurig, Cemlyn Bay and The Skerries SPA and SSSI, and the Cemlyn Bay SAC, as well as the Wylfa Head Local Nature Reserve. Within 20 km there are some seven additional European designated sites including five SACs. These include Holy Island SAC and SPA and Llyn Dinam SAC.</p> <p>A holistic approach to biodiversity should recognise that biodiversity is more than just the reflection of designated sites. It is an interrelated network of habitats and species, of which designated sites and species are those that are most fragile or rare and require the highest degree of protection. Many non designated species of flora and fauna are found in the area.</p> <p>A generic assessment on the impacts of the radioactive discharges on wildlife from the UK's nuclear power stations concluded that the chronic dose rate guideline was not exceeded for any of the assessed marine or terrestrial organisms. Furthermore, the estimated doses to wildlife were below the level at which effects could be observed.</p> <p>The supporting figure highlights the context of the nuclear licensed site and its immediate surroundings. The area shown in the figure does not attempt to identify all potential designated sites that may be affected by activities associated with the Revised NDA Strategy. Rather, it attempts to strike a balance between highlighting those sites that are in the vicinity of the nuclear licensed site between different topic themes. Hence, more expansive coverage would reduce the visibility of other designated sites (such as Scheduled Ancient Monuments which, by their nature, have significantly smaller coverage than ecological based designated areas).</p>	<p>Magnox North (2008) <i>Wylfa Power Station Environmental Statement</i>; NDA (2005) <i>EAPINS Project Questionnaire</i>; Environment Agency (2002) <i>Impact Assessment of Ionising Radiation on Wildlife</i>; DECC (2009) <i>HRA Site Report for Wylfa</i>.</p>
Landscape and Visual	<p>Wylfa nuclear power station is located in the Anglesey coast national character area. At a county level, the site is situated within the North West Anglesey character area which is defined by the dominance of a drumlin field. The drumlins are interspersed with a number of harder rock features, particularly along the coastal fringes such as Wylfa Head. A distinct feature of the area is the nuclear power station. The landscape features of the area are a rocky shoreline to the northwest, a level outcrop with craggy shoreline to the northeast and an area of flat small scale agricultural fields to the south.</p> <p>The Wylfa power station site is surrounded by the north Anglesey Heritage Coast to the east and west, which is also designated as an Area of Outstanding Natural Beauty (AONB) for its rich diversity.</p>	<p>Isle of Anglesey County Council (www.anglesey.gov.uk); NDA (2005) <i>EAPINS Project Questionnaire</i>; Magnox North (2008) <i>Wylfa Power Station Environmental Statement</i></p>
Cultural Heritage	<p>There are no Scheduled Ancient Monuments (SAM) within or adjacent to the site. The nearest being Bronze Age standing stones some 2.5 km to the south west. Cestyll Gardens is located some 0.5 km to the south west of the operational site. It is listed as a Grade II feature on the register of landscapes, parks and gardens of historic interest in Wales. Of interest is the nearby</p>	<p>Magnox North (2008) <i>Wylfa Power Station Environmental</i></p>

	<p>surrounding landscape that was designed by Dame Sylvia Crowe who was also responsible for landscaping at Trawsfynydd. However, this is not registered at present, although Cadw are considering it for inclusion in the register of landscapes, parks and gardens of historic interest in Wales. Also, relatively near by is Cafnan Mill which is of some historic interest. Indeed three listed buildings associated with the operation of the mill are situated within 1 km of the operational site at Felin Gafnan. These are a Grade II corn drying house, a Grade II corn mill and a Grade II mill house. The North Anglesey Coast Heritage Coast, a non-statutory designated site, is located close to the licensed site boundary.</p>	<p><i>Statement, Royal Commission on the Ancient and Historical Monuments of Wales</i> www.coflein.gov.uk</p>
<p>Groundwater, Geology and Soils</p>	<p>There have been no known incidents of ground contamination at the operational site. No land contaminated with radioactive material has been identified. However, the Integrated Waste Strategy 2007/08 anticipates a possible volume of approximately 1,000 m³ of land contaminated with radioactive material arising during final site clearance, which will require treatment as Low Level Waste (LLW). The environmental statement highlights that isolated areas of conventional contamination have been identified, including elevated concentrations of chlorinated solvents measures to the south of the site (outside of the nuclear licensed site boundary). The source is identified as possibly a buried tank which was used during the construction of the power station. Anecdotal evidence suggests that there may be some isolated areas of conventionally contaminated soils south of the licensed site from mine waste (potentially containing heavy metals) which may have been used to form the contractors' overspill car park to the south of the operational site.</p> <p>Several incidents have been recorded relating to the spillage or loss of hydrocarbon products. However, none of these are considered to have the capacity to significantly affect the underlying soils or groundwater.</p> <p>Groundwater is classified as being of poor chemical status but good quantitative status in the area.</p> <p>Henborth approximately 3km to the west and Llanbadrig – Dinas Gynfor, approximately 3km to the east of the licensed site are designated SSSIs for their geomorphological features.</p>	<p>NDA (2005) <i>EAPINS Project Questionnaire</i>; NDA (2007) <i>Wylfa 2007/08 IWS</i>; Magnox North (2008) <i>Wylfa Power Station Environmental Statement</i>; Environment Agency (2009) <i>Water for life and livelihoods – River Basin Management Plan Western Wales River Basin District</i></p>
<p>Surface Water Resources and Quality</p>	<p>The closest bathing water site monitored by the Environment Agency is Cemlyn to the east of the Wylfa. In 2007 it achieved a pass, complying with the necessary standards for water quality. Although the Wylfa site discharges some radioactive wastes to water, it has not recorded any breaches against the relevant permits for such discharges. Off shore waters have been monitored for a range of substances approximately 3.75km to the northeast of the power station. Traces of Mercury, Iron and Cadmium were recorded but were below the Environmental Quality Standards for salt water on all occasions, except on 28th November 2006, when iron slightly exceeded the quality standards. The coastal water quality adjacent to Wylfa is classified as being of good ecological quality status and good chemical status in accordance with the Water Framework Directive.</p> <p>The RIFE data highlights that Wylfa discharged 3 TBq of tritium (20% of the annual discharge limit) and 0.012 TBq of other radionuclides (1.1% of annual discharge limit). The discharges were assessed to result in doses to the critical group (a group or representative individual who receive the largest dose from artificially produced radionuclides due to their habits, diet and where they spend their time) of 0.007 mSv/y, or 0.7% of the public dose limit of 1 mSv/y (from all sources).</p>	<p>Environment Agency (2008) <i>2007 Bathing Waters Report Wales</i>; NDA (2005) <i>EAPINS Project Questionnaire</i>; Environment Agency, et al. (2009) <i>Radioactivity in Food and the Environment</i>; Magnox North (2008) <i>Wylfa Power Station Environmental Statement</i>; Environment Agency (2009) <i>Water for life and livelihoods – River Basin</i></p>

		<i>Management Plan Western Wales River Basin District</i>
Waste	<p>Wylfa was the last Magnox nuclear power station built. It was also the largest of the Magnox designs. The decommissioning of the site is likely to generate substantial volumes of waste. According to the Integrated Waste Strategy (2007/08) baseline, it is estimated that the total amount of waste generated during decommissioning will result in some 32,770 m³ of packaged Low Level Waste (LLW) requiring disposal, the majority arising during final site clearance. Additionally, some 15,232 m³ of packaged Intermediate Level Waste (ILW) will be generated, the majority arising during final site clearance. Decommissioning is also anticipated to generate some 81,054 m³ of inert waste.</p> <p>In 2007, approximately 41 tonnes of Inert Waste was generated, of which 77% was reused or recycled. Approximately 810 tonnes of non-hazardous waste was also generated, of which 80% was reused or recycled and some 102 tonnes of hazardous waste was generated, of which 56% was reused or recycled.</p>	<p>Magnox Electric Ltd (2007) <i>Wylfa 2007/08 IWS</i> ; NDA (2008) <i>NSP Returns</i></p>
Economy, Society and Skills	<p>The Wylfa site directly supports 750 staff, including subcontractors. Approximately £2.2 million worth of contracts were placed with local businesses in 2005. The site is a major employer on Anglesey and has become integral to the community.</p> <p>In 2006, the percentage of Anglesey's population with the equivalent of NVQ level 4/5 qualification (e.g. a degree or above) was 21.1% compared to the national average for Wales of 24.3%. Similarly, there are a slightly higher number of residents with no qualifications than the national average (18.4% compared with 16.2% for Wales).</p>	<p>NDA (2005) <i>EAPINS Project Questionnaire</i>; NDA (2007) <i>Wylfa Socio-Economic Plan 2007/08</i></p> <p>Office for National Statistics (www.statistics.gov.uk)</p> <p>Magnox North (2008) <i>Wylfa Power Station Environmental Statement</i></p>
Traffic and Transport	<p>Wylfa is relatively isolated from the strategic road network on the northern coast of Anglesey. The preferred routes to the M6 are via the A5025 toward Holyhead then the A55 south, or the A5025 toward Bangor, North Wales. From here it is possible to travel east along the A55 towards the motorway, and other strategic 'A' roads. Annual Average Daily Traffic (AADT) flows from 2007 indicate that there were 36,000 vehicle movements on the A55 across the Pont Britannia bridge from Anglesey to North Wales. AADT flows on the A5025 to the east of the operational site indicated approximately 3,600 vehicle movements. The power station access road (South) indicated 1,446 vehicle movements.</p> <p>AADT traffic flows for the site indicate 33 HGV movements along the access road (South), whilst 78 HGV movements are recorded on the A5025 to the east of the site and 88 are recorded on the A5025 to the west of the site.</p>	<p>Magnox North (2008) <i>Wylfa power Station Environmental Statement</i></p>
Land Use and Material Assets	<p>The site is bordered to the north and west by the Irish Sea. To the south is predominantly rural land used for agricultural purposes. The nearest notable settlement is Cemaes, approximately 1.5 km to the east. There is also a camping and caravanning site relatively nearby to the east of Wylfa, on the outskirts of Cemaes.</p> <p>The operational site consumes some 380 m³ of fuel oil annually. In 2007, it consumed nearly</p>	<p>Ordnance Survey (www.ordnancesurvey.co.uk) NDA (2008) <i>NSP Returns</i></p>

	645,000 m ³ of water (excluding cooling water intake).	
Noise and Vibration	The predicted noise levels around the site whilst Wylfa is generating range from 31.5 L _{Aeq} at receptors some 1.9 km east, to 53.6 L _{Aeq} at receptors some 1.1 km to the southwest. The baseline noise levels (measured background noise minus the Wylfa generation) range from 37.7 L _{Aeq} 400 m east, to 55.2 L _{Aeq} 1.1 km to the southwest. There have been no complaints received by local residents. Similarly, vibration levels are not considered to be significant.	Magnox North (2008) <i>Wylfa Power Station Environmental Statement</i> ; NDA (2005) <i>EAPINS Project Questionnaire</i>
Health and Safety	The discharges to the atmosphere were assessed to result in doses to the critical group (a group or representative individual who receive the largest dose from artificially produced radionuclides due to their habits, diet and where they spend their time) of less than 0.005 mSv/y, or less than 0.5% of the public dose limit (from all sources) or less than 0.25% of the annual average UK public background radiation exposure. The critical group affected by discharge to waters received a dose assessed to be 0.007 mSv/y equivalent to 0.7% of the public dose limit (from all sources). The mean worker dose for employees was 0.134 mSv/y in 2007 with the mean dose for contractors slightly higher at 0.173 mSv/y. Workers at Wylfa are subject to a maximum exposure of 4.3 mSv/y. The statutory occupational limit is 20 mSv/y. In the year 2007/08, Wylfa recorded 3 RIDDOR incidents and had an Occupational Safety and Health Administration (OSHA) Total Recordable Incident Rate (TRIR) of 0.5.	Environment Agency, et al. (2009) <i>Radioactivity in Food and the Environment</i> ; NDA (2008) <i>Annual HSSE Report</i>
Hazard Reduction	The top strategic priority for the NDA is to ensure that radioactive wastes on its sites are converted in to a safe form for disposal. This process is known as hazard reduction. In determining the level of hazard potential, consideration was given to its physical form, quantity and conditions of storage, as well as the amount of radioactivity it contains. In 2008, Wylfa was ranked 18 th out of the 19 NDA sites in terms of the level of concern for hazards.	NDA (2008) <i>Project to assess levels of concern posed by radioactive wastes at NDA sites.</i>

Future Developments

The Wylfa site is due to cease electricity generation in 2010. Discharges will decline significantly when the site shuts down and are expected to continue to decline during the care and maintenance preparations, although certain decommissioning activities may result in short term increases in discharges for example as legacy wastes are retrieved and processed to make them passively safe. It is anticipated that there will be negligible discharges from the site during the decommissioning care and maintenance period. Higher discharges, especially those to air, may occur during final site clearance when the reactors are dismantled but these discharges have not been estimated in detail at this time.

Significant volumes of radioactive waste will be generated, which will be treated, packaged and, where necessary, stored on site in purpose built temporary structures, until it is removed for permanent off-site disposal. Discharges of radionuclides to the air and water are likely to reduce during care and maintenance, before increasing during final site clearance due to the increase in activity levels associated with reactor demolition.

Water and energy use will also decrease significantly when the site ceases to generate.

Environmental Issues

Wylfa is a relatively important contributor to the local economy, and long term changes to employment levels as a result of decommissioning may have a significant effect on local communities.

The distance from the strategic road network, and the fact that Anglesey is an island with only two permanent bridge connections to the mainland, would suggest that any changes in traffic are likely to be relatively noticeable. Contaminated land at Wylfa, while expected to be relatively modest has not yet been fully characterised.

