

# Strategic Environmental Assessment

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## Site Specific Baseline Sizewell A

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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 Sizewell A 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 Sizewell A

### Sizewell A

The Sizewell A nuclear power station is located across some 10 hectares on the Suffolk coast. It began generating electricity in 1966 and continued to do so for 40 years until 2006. Decommissioning work began in 2007 with defuelling. The operational site is currently in defuelling, whereby all remaining fuel is removed from the reactor, and is anticipated to continue until 2013. Care and maintenance preparation is anticipated to last from 2013 to 2034 and will involve the demolition of many structures on site, including the turbine hall, workshops and stores. The reactors will also be modified to ensure they are structurally sound for care and maintenance. Care and maintenance is anticipated to last until 2098 before final site clearance begins, which will see the removal of the reactors and any wastes stored on site and should be completed in 2098, these dates are detailed in Sizewell Life Time Plan

### Site End State Assumption

The proposed end state for the Sizewell A operational site is for the complete removal of all structures to 1m below ground level, along with contaminated land remediation. The decommissioning works will result in the site being delicensed to allow it to be used for alternative purposes. Following a period of consultation and subsequent reconciliation process, the preferred end state highlighted by local stakeholders is for the site to be accessible to the public and used for recreational and nature conservation purposes, reflecting its location within an Area of Outstanding Natural Beauty (AONB).

### Current Environmental Baseline

**Table 11: Baseline Data across all topics for Sizewell A**

SEA Objective	Key Environmental Baseline	Source
<b>Air Quality</b>	<p>Air quality within the Suffolk Coastal District is good and there are no Air Quality Management Areas required. There are currently a number of processes at Sizewell resulting in emissions to atmosphere however, a recent review found that these emissions would not exceed the air quality objectives and that no further assessment was required.</p> <p>Sizewell A is authorised to operate an on-site solid LLW incinerator and an oil burning incinerator for low levels of radioactive oil.</p> <p>Results from Environment Agency returns for the calendar year 2009 highlighted Sizewell A discharged <math>1.6 \times 10^{-6}</math> TBq of beta radionuclides to the atmosphere, amounting to less than 1% of the annual discharge limits. It also discharged 0.214 TBq of tritium (amounting to 6% of annual discharge limits), 0.0131 TBq of carbon-14 (amounting to 0.7% of annual discharge limits), and <math>2.02 \times 10^{-3}</math> TBq of sulphur-35 (amounting to less than 1% of annual discharge limits).</p> <p>The discharges were assessed to result in doses to the critical group (a group or representative</p>	<p>Sizewell A Nuclear Power Station Environmental Statement (2005); Environment Agency et al. (2009) <i>Radioactivity in Food and the Environment</i></p>

	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, equivalent less than 0.5% of the public dose limit of 1 mSv/y.	
<b>Climate Change and Energy</b>	Predictions of UK mean sea level rise have been coupled with relative land changes across the UK to give an overall indication of change in sea level at Sizewell by the year 2100 of between 0.43 m and 0.62 m, depending on the extent to which current emission levels change. In 2007, Sizewell A consumed 84 TJ of energy and this together with other sources resulted in greenhouse gas emissions of approximately 480 tonnes of CO <sub>2</sub> equivalent.	Sizewell A Nuclear Power Station Environmental Statement (2005); NDA (2008) <i>NSP Returns</i>
<b>Biodiversity, Flora and Fauna</b>	<p>Although the power station site itself is considered to be of very limited nature conservation value, Sizewell is surrounded by a number of important habitats.</p> <p>The following sites all lie within 1km of the site; The Minsmere-Walberswick Heaths and Marshes Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC). The Minsmere-Walberswick Special Protection Area (SPA) and Ramsar site are also incorporated within the SSSI.</p> <p>Sizewell A and the surrounding NDA land holding is home to a number of protected species including badgers, bats, grass snakes, slow worms and adders. The site's cooling water intake and outfall have also been identified as a nesting site for Kittiwakes and Cormorants. Black redstarts are also known to breed within the Sizewell A power station.</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 UK Nuclear Industry LLW 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.</p>	Sizewell A Nuclear Power Station Environmental Statement (2005); Environment Agency (2002) <i>Impact Assessment of Ionising Radiation on Wildlife</i>
<b>Landscape and Visual</b>	<p>The Sizewell site lies within the Suffolk Coast and Heaths AONB and Heritage Coast.</p> <p>The gently undulating landform combined with existing trees and hedgerows tends to screen most inland views of both the power station in all but the closest viewpoints, with some notable exceptions just north of Leiston.</p> <p>Views of the power station are available from Sizewell Beach at up to 2km away and also the Suffolk Coast and Heaths Path (over 5km).</p>	Sizewell A Nuclear Power Station Environmental Statement (2005)
<b>Cultural Heritage</b>	<p>There are no Scheduled Ancient Monuments (SAMs) at Sizewell A power station. The nearest are the first and second sites of Leiston Abbey, approximately 3 km to the north and northwest. There are no listed buildings at Sizewell A power station, the nearest being Leiston Hall Farm (Grade II) and Leiston House Farmhouse (Grade II) to the west of Leiston. There are no registered parks or gardens on or adjacent to the power station site. The nearest Conservation area is the centre of Leiston.</p> <p>No features of archaeological or historical interest lie within the Sizewell site.</p>	Sizewell A Nuclear Power Station Environmental Statement (2005)
<b>Groundwater, Geology and Soils</b>	<p>Below the made ground of the power station site are sandy deposits belonging to the Crag Group of Plio-Pleistocene age.</p> <p>Desk studies indicate that, in general, spills and leaks of radiological significance are confined to minor spills down the external walls of some of the buildings. There are also very low levels of</p>	Sizewell A Nuclear Power Station Environmental Statement

	<p>radioactive contamination due to aerosol deposition around the surge chambers.</p> <p>It is estimated that there is 308 m<sup>3</sup> of soil contaminated with radioactive material which will require treatment as Low Level Waste (LLW), and is expected to be generated during final site clearance.</p>	<p>(2005); NDA (2007) <i>2009 Radioactive Waste Inventory Sizewell A Site.</i></p>
<p><b>Surface Water Resources and Quality</b></p>	<p>There is no routine water quality monitoring of the Sizewell Belts undertaken but this area is likely to have similar characteristics to the Leiston Brook.</p> <p>The chemical quality of the water at Leiston Brook is graded as poor and the biological quality as fair (although no reasons for this grading have been identified). In 2002, the nearest beach to Sizewell site was graded as 'excellent' under the Bathing Waters Directive compliance criteria. According to the River Basin Management Plan, the Minsmere River to the north of the site is classified as being of potentially moderate ecological quality in accordance with the Water Framework Directive. Coastal water adjacent to the site is considered to have potentially moderate ecological quality and good chemical status in accordance with the Water Framework Directive.</p> <p>Results from Environment Agency returns for the calendar year 2009 highlighted that Sizewell A discharged 0.052 TBq of tritium amounting to 0.48% of the annual discharge limit. Some 0.117 TBq of caesium-137 liquid discharge, amounting to 12% of the annual discharge limit, as well as some 0.060 TBq of other radionuclides, amounting to 9% of the authorised annual discharge limits were also discharged.</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, equivalent to less than 0.5% of the public dose limit of 1 mSv/y.</p> <p>Approximately 384,000m<sup>3</sup> of water was consumed in 2004, although this is likely to decrease significantly during the decommissioning process. Indeed, in 2007, Sizewell A consumed 122,900 m<sup>3</sup> of water.</p>	<p>Sizewell A Nuclear Power Station Environmental Statement (2005); Environment Agency et al. (2009) <i>Radioactivity in Food and the Environment</i>; Environment Agency (2009) <i>Water for life and livelihoods – River Basin Management Plan Anglian River Basin District</i></p>
<p><b>Waste</b></p>	<p>General Low Level Waste (LLW) is created during routine operations and maintenance of the plant during the generation phase and during decommissioning processes. It is treated as it arises, using conventional methods in existing facilities. It is sorted in waste streams and then drummed, incinerated or processed into disposal containers, for disposal off-site</p> <p>It is anticipated that the decommissioning process will result in approximately 30,000 m<sup>3</sup> of LLW, the majority of which will be generated during final site clearance. It is expected that once packaged, it will result in approximately 36,200 m<sup>3</sup> of LLW for disposal.</p> <p>It is anticipated that decommissioning at Sizewell A will also result in 5,700 m<sup>3</sup> Intermediate Level Waste (ILW) which once packaged will result in approximately 6,300 m<sup>3</sup> of ILW for disposal. The majority is anticipated to be generated during final site clearance.</p> <p>In 2007, Sizewell A generated 570 tonnes of non-hazardous waste, of which 69% was reused or recycled. An additional 86 tonnes of hazardous waste was generated, of which 51% was reused or recycled, and some 250 tonnes of inert waste was generated, of which 100% was reused or recycled.</p>	<p>NDA (2007) <i>Sizewell A 2007/08 IWS</i></p> <p>NDA (2005) <i>EAPINS Project Questionnaire</i> ;</p> <p>NDA (2008) <i>NSP Returns</i></p>
<p><b>Economy, Society and Skills</b></p>	<p>According to the Office of National Statistics 2003 population estimate Suffolk Coastal local authority district currently has a resident population of around 117,000.</p> <p>Population growth in Suffolk Coastal district has been substantial during the last decade, with a population increase of 8.3% recorded between 1993 and 2003. This compares with increases of 6.0% in the Eastern region and only 3.6% in England.</p> <p>According to the 2001 Census, there were approximately 48,000 Suffolk Coastal residents in employment. The main concentrations of employment in Suffolk Coastal are found in the southeast of the District, in Felixstowe and the Trimleys, and the Ipswich eastern fringes.</p>	<p>Sizewell A Nuclear Power Station Environmental Statement (2005)</p>

	<p>Employment growth in the local economy has been relatively slow during the last decade, compared with county, regional and national averages. The number of employee jobs in Suffolk Coastal district increased by less than 12% between 1991 and 2002, This compares with average employment growth of 23% in the Eastern region and 20% nationally.</p> <p>However, the level of unemployment in Suffolk Coastal district is currently very low, and is well below county, regional and national rates. Average earnings levels in Suffolk Coastal district are currently well above the Suffolk average, but slightly below the regional and national averages. The level of unemployment in Suffolk Coastal district is currently very low, and is well below county, regional and national rates. Approximately 410 jobs are directly supported at Sizewell A, along with an additional 80 indirect. Post-2034, it is estimated that there will be a significant decrease in the number of jobs (a loss of 400).</p> <p>Compared to the national average, residents within the Suffolk Coastal District are relatively well educated. In 2003 the percentage of 15 year olds achieving 5 or more GCSEs Grades A*-C, was almost 20% higher than the national average.</p> <p>The Proportion of working population with NVQ Level 4 or above is also higher than both the regional and national average</p>	
<b>Traffic and Transport</b>	<p>Sizewell can be easily reached from both national and local roads. Traffic flow on the road network is relatively low and drivers rarely experience congestion.</p> <p>Access to Sizewell by public transport is poor. There is a limited bus service to Sizewell village. Service 195 Saxmundham – Leiston, extends to Sizewell for two journeys per day, Monday – Friday, otherwise the nearest bus services are at Leiston. There are no bus services operated for staff at Sizewell. There is no rail access close to the site. The nearest station for passenger services is at Saxmundham, some 5.5 miles from the site.</p> <p>There is a specific facility for cyclists and pedestrians which connects the power station to Leiston. This is in the form of a shared track alongside the C228. In general, the number of staff walking or cycling to work is very low.</p>	Sizewell A Nuclear Power Station Environmental Statement (2005); NDA (2005) <i>EAPINS Project Questionnaire</i>
<b>Land Use and Material Assets</b>	<p>The site occupies an area of 10 hectares and is located off the A12 just north of Sizewell village. It lies within the Suffolk Coast and Heaths AONB and Heritage Coast.</p> <p>In 2004 the site consumed some 41,000 litres of oil, although this is likely to significantly decrease as a result of the cessation of electricity generation.</p>	Sizewell A Nuclear Power Station Environmental Statement (2005)
<b>Noise and Vibration</b>	<p>The noise levels within the Sizewell area are relatively low. The combined traffic and electricity generating noise levels range between 39.9 and 63.1 dB(A).</p> <p>Previous studies of vibration levels have been undertaken at other nuclear power and measurements indicated that vibration levels were very low. It was considered that the operation of these power stations had no influence on vibration levels in the surrounding area. It is therefore assumed that the operation of Sizewell A also had no influence on vibration levels in the area.</p>	Sizewell A Nuclear Power Station Environmental Statement (2005)
<b>Health and Safety</b>	<p>A 2004 analysis of seafood, sediment, sand and seawater, and measurements of gamma dose rates in intertidal areas were low. The radiation dose to local fish and shellfish consumers was also low. Analysis of radiation in milk, crops and fruit generally showed very low levels of artificial radionuclides near the power stations in 2004.</p> <p>The discharges to 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. This is approximately 0.5% of the public dose limit and 0.25% of the annual average UK public background exposure to radiation. The impacts of the liquid discharges to the aquatic environment were assessed at less than 0.005 mSv/y, equivalent to less than 0.5% of the public</p>	Environment Agency et al. (2009) <i>Radioactivity in Food and the Environment</i> ; NDA (2005) <i>EAPINS Project Questionnaire</i> NDA (2008)

	<p>dose limit.</p> <p>The maximum dose to workers at Sizewell A in 2007 was 1.548 mSv/y compared with a dose limit of 20 mSv/y. The mean employee dose in 2007 was 0.058 mSv/y, while the mean contractor dose was 0.027 mSv/y.</p> <p>In 2007, the site had no RIDDOR reportable incidents and had an Occupational Safety and Hazard Administration (OSHA) Total Recordable Incident Rate (TRIR) of 0, reflecting the very low number of incidents for hours worked.</p>	<p>Annual HSSE Report</p>
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## Future Developments

There is likely to be a significant loss of jobs following the completion of care and maintenance preparations, when the workforce is anticipated to decrease from 410 to 10. It is also likely to have a significant effect on the local economy. However, assuming employment predictions for final site clearance, there will be an increase in the early 22<sup>nd</sup> century from 10 to 300 employees until 2110.

It is anticipated that there will be limited discharges and waste arisings from the site during the decommissioning phase care and maintenance period. Higher discharges especially those to air may be anticipated to occur during final site clearance when the reactors are dismantled but these discharges have not been estimated in detail at this time.

Radioactive waste will be packaged on site to reduce the hazard. There will be an increase in LLW for disposal at the LLW Repository near Drigg, Cumbria. It is anticipated that the majority of radioactive waste will be generated during final site clearance. ILW stored on-site will be removed and transported to a national repository from 2040.

There will be a decrease in the number of jobs supported by the site during the decommissioning care and maintenance period although it is anticipated that, should current technology exist, there will be approximately 290 jobs generated for the final site clearance in approximately 90 years' time.

The operational site is located adjacent to the Suffolk coastline and is likely to be subject to an increased risk of flooding as a result of anticipated sea level rises associated with predicted climate change, as well as erosion of the shoreline.

## Environmental Issues

Predictions of the UK mean sea level rise have been coupled with relative isostatic land changes across the UK to give an overall indication of change in sea level at Sizewell by the year 2100 of between 0.43 m and 0.62 m, depending on the extent to which current emission levels change. The operational site lies within an AONB and is situated in close proximity to a number of designated sites to the north and south. There is potential for changes in the level of activities during decommissioning to affect such sites.

The likely reduction in employment at the site as decommissioning progresses is likely to have a significant impact on the local economy.

