

Strategic Environmental Assessment Site Specific Baseline

Dungeness A Site



FOREWORD

This document has been prepared to support the NDA's Strategic Environmental Assessment of its decommissioning strategy for the 10 Magnox Sites. This document contains baseline environmental information and other relevant environmental data.

STRATEGIC ENVIRONMENTAL ASSESSMENT Site Specific Baseline

Dungeness A Site
Romney Marsh
Kent
TN29 9PP

Dungeness A Site

Dungeness A Site is a twin reactor Magnox station undergoing defuelling, and is located in the Shepway District of the county of Kent, South East England . It is located at the southern tip of the Dungeness peninsula, a large expanse of shingle on the coast of the English Channel, from which it drew cooling water supplies during its operational phase. EDF's Dungeness B power station is situated immediately adjacent to the west. The site covers an area of 20 hectares ¹. The following describes the key dates for Dungeness A Site:

- Construction of Dungeness A Site commenced in 1960, and electricity was first supplied to the grid in 1965 ¹.
- The site ceased electricity generation in 2006 after 41 years of operation ¹.
- Removal of all the fuel from site is expected to be completed by the end of 2012 ².
- The Care and Maintenance Preparations (C&MP) phase of the decommissioning process is scheduled to be completed in 2027 ^a at which point the site will enter the Care and Maintenance (C&M) phase ³.
- Final Site Clearance (FSC) is scheduled to commence at the end of the C&M phase. All remaining structures on the site will be cleared by 2098 ³.

1. Magnox Ltd (2011) Dungeness A – Facts and Figures. Available at <http://www.magnoxsites.co.uk/our-sites/dungeness-a/facts-and-figures>

2. Magnox Ltd (2011) Dungeness A Site Integrated Waste Strategy (IWS)

3. Magnox Ltd. (2011) LC35 Magnox Optimised Decommissioning Plan, Dungeness A Site

^a The C&MP phase at Dungeness A is subdivided into 3 distinct phases as part of the Magnox Optimised Decommissioning Plan (MODP). The first of these is Optimised Care and Maintenance Preparations (OC&MP) phase during which hazard reduction works such as ILW passivation are to be undertaken, and will be 7 years in duration. This phase will be followed by an Interim Care and Maintenance (IC&M) period when no active decommissioning will be undertaken and staff levels will be reduced and the site will be maintained in a semi-quiescent state. This phase will last for 4 years. Following this phase, Remaining Care and Maintenance Preparations (RC&MP) will be undertaken, which will involve undertaking remaining decommissioning and demolition works. This phase will be completed in 2027, allowing the site to enter the fully quiescent C&M phase.

Site End State Assumption

The planned end state for Dungeness A Site is defined in the NDA Strategy Document 2011. This states: *'Radioactive and non-radioactive contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land. Where the next planned use no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for delicensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime. The physical state of designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.'*

Current Environment Baseline

Table 1: Baseline Data for all SEA Objectives for Dungeness A Site

SEA Objective	Environmental Baseline Data	References
Air Quality	<p><u>Radioactive Discharges</u></p> <ul style="list-style-type: none"> Aerial discharges of radioactivity have reduced since the cessation of generation. The reactor cores at Dungeness A are enclosed within Steel Pressure Vessels (SPVs), which are in turn contained within concrete structures ('bioshields') designed to protect site personnel from radiation originating from within the cores. During operations discharges of aerial activity resulted from ventilation of the bioshield voids, which released gaseous activation products when the reactors were under load. Periodic venting of reactor coolant gas was carried out during the operational phase. This has ceased since the end of generation. Nuclear operations including waste retrieval which are being undertaken as part of the decommissioning works result in minor but regular aerial discharges of radioactivity. <p><u>Conventional Discharges</u></p> <ul style="list-style-type: none"> Vehicles, a package boiler and a waste incinerator are used on Dungeness A Site, which are sources of air quality contaminants including NO_x (oxides of nitrogen), SO_x (oxides of sulphur), O₃ (ozone) and PM₁₀ (particulate with a diameter <10µm). These sources run only intermittently, and due to the rural nature of the site average levels of these pollutants are likely to be low. Discharges from these sources will likely remain steady throughout the C&MP phase. Dust is currently, and will in future, be generated from construction and demolition activities undertaken on the site as part of C&MP. Mitigation of this dust is undertaken in all instances. 	
Global Change and Energy	<ul style="list-style-type: none"> Throughout its lifetime Dungeness A Site has drawn power from the National Grid to satisfy domestic power needs (heavy plant items such as the gas circulators and cooling water pumps were driven by power derived directly from the station's output). The use of this energy has resulted in indirect CO₂ emissions, due to the mixed generation used in the UK. In addition to grid supplies, the site has several essential items of plant for the provision of back up power, and are fossil fuel powered. At Dungeness A Site this auxiliary equipment consists of diesel generators. These machines are not in constant use; instead they are there for emergencies, but are regularly run for testing purposes. Plant related to defuelling must be maintained at a certain temperature for the duration of the defuelling phase, which results in emissions from the boilers. A small number of vehicles of different types (including vans, forklift trucks, roadsweepers, tractors) are based at Dungeness A Site which are either used within the site footprint or move from the site to further afield (e.g. vehicles used in carrying out the District Survey, which is shared with 'B' Site), and have associated carbon emissions. In addition, indirect carbon emissions originate from the use of hire vehicles by site personnel when travelling on company business. Magnox Ltd. has registered under the Carbon Reduction Commitment (CRC) and also has a company-wide Energy Efficiency Policy. Both of these schemes are currently being implemented on a site by site basis, with the aim of minimising greenhouse gas emissions across the company. 	<p>1. Magnox Ltd. (2011) Dungeness A IWS</p>

<p>Biodiversity, Flora and Fauna</p>	<ul style="list-style-type: none"> Dungeness A Site is situated in a rural setting, and has 4 designated areas in close proximity. These designated areas are: <ul style="list-style-type: none"> Dungeness, Romney Marsh and Rye Bay Site of Special Scientific Interest Dungeness Special Area of Conservation Dungeness National Nature Reserve Dungeness to Pett Level Special Protection Area Due to these designations the coastline adjacent to Dungeness A is also classified as the Dungeness European Marine Site^{3 b}. The site Biodiversity Action Plan considers how the site manages its impacts on local ecosystems. This document is reviewed and updated on a regular basis. The Environment Agency (EA) concluded that exposure to ionising radiation from authorised discharges of radioactivity from the UK’s nuclear installations did not significantly impact wildlife in England and Wales². 	<ol style="list-style-type: none"> Magnox South (2009) Dungeness A Site Environmental Impact Assessment Baseline Environment Agency (2002) Impact Assessment of Ionising Radiation on Wildlife Natural England (2011) England’s European Marine Sites, available at http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/europeansites.aspx
<p>Landscape and Visual</p>	<ul style="list-style-type: none"> Dungeness A Site is located on the southern tip of the Dungeness Peninsula, which projects approximately 10km into the English Channel from the south coast of England¹. The landscape around the station is low lying shingle foreland, with the low-lying Romney Marsh situated to the north². The reactor buildings and other site structures are combined with that of the adjacent Dungeness ‘B’ Site. The stations are highly visible from short distances at various locations on the peninsula. At medium-long distances the stations are partially obscured but still visible from certain locations. The only other large buildings nearby are the Old and New Lighthouses, so Dungeness Power Station is a prominent feature in the local landscape². 	<ol style="list-style-type: none"> Ordnance Survey (2011) 1:25,000 Sheet 125, Romney Marsh Magnox South (2009) Dungeness A Site Environmental Impact Assessment Baseline (EIAB)
<p>Cultural Heritage</p>	<ul style="list-style-type: none"> There is 1 Scheduled Monument, the WWII-era Acoustic Listening Devices, to the north of the site. There is 1 Grade I, 1 Grade II* and 1 Grade II Listed Building within 5km of Dungeness A Site. There are no entries in the draft Register of Landscapes, Parks and Gardens of Special Historic Interest, as listed by Natural England near to Dungeness A Site. 	<p>Magnox South (2009) Dungeness A EIAB</p>

^b Where an SPA or SAC is continuously or intermittently covered by tidal waters or includes any part of the sea adjacent to the UK, the site is referred to as a European Marine Site.

<p>Groundwater, Geology and Soils</p>	<ul style="list-style-type: none"> The Dungeness Peninsula is a cusplate foreland which comprises the largest expanse of shingle in Europe. Directly underlying much of the site is 'made ground', consisting of reworked Denge Gravel, sand and anthropogenic materials. The natural superficial deposits comprising this structure consist of a layer of Quaternary age Denge gravels, which are storm beach gravel deposits, consisting of fine to coarse flinty (chert) gravels. A similar thickness of Marine and Estuary silty sands underlie these gravels. The bedrock at Dungeness A Site consists of several different units of the Cretaceous Hastings Beds. The uppermost Tunbridge Wells sands consist of a thick layer of silts with interbedded silty clays and sandstones. The Wadhurst clay, consisting of interlaminated shales and siltstones, with bands of nodular clay-ironstone and thin layers of shelly limestone underlie this unit, which is in turn underlain by the Ashdown beds. This consists of interbedded sand-, silt-, and mudstones. A major fault passes northwest – southeast to the west of the site. The superficial deposits at Dungeness A Site are considered a Minor aquifer with significant hydraulic conductivity (anisotropy in this conductivity of ridges and furrows in the gravels has been recorded, attributed to varying sand content). The made ground on the site itself is unclassified. The bedrock at Dungeness A Site is considered a Minor aquifer. There are 2 licenced abstractions within 5km of site. One of these licences is held by EDF to supply lagoons for emergency cooling at Dungeness B, and the other by Folkestone and Dover Water Services company for unknown purposes Given the unique coastal nature of the geology at the site, no fertile topsoil is present on the shingle on the peninsula adjacent to the site, so this land has no agricultural value. The reclaimed marshland to the north contains some agricultural soils of marginal value. <p><u>Land Quality</u></p> <ul style="list-style-type: none"> Dungeness A Site is considered to have the potential for land that is radioactively contaminated, and incorporates land that is chemically contaminated. <ul style="list-style-type: none"> The high hydraulic conductivity of the Denge gravels results in the rapid movement of groundwater out to sea. This hydrogeological regime can result in contaminants being rapidly transported and dispersed. Intrusive investigations to date have revealed only minor pockets of radioactively contaminated soil and groundwater. The chemical land contamination is due to hydrocarbons and is associated with storage of oily plant items and historical solvent disposal practices. Additionally, a significant historical hydrocarbon leak at Dungeness B Site has potentially affected the northern area of Dungeness A Site. 	<p>Magnox South (2009) Dungeness A EIAB</p>
<p>Surface Water Resources and Quality</p>	<ul style="list-style-type: none"> The nearest water body to Dungeness A Site is the English Channel ¹. The bathing water quality of the English Channel in the site's locality is considered good – moderate. The nearest sampling points are situated approximately 1.5km to the north and 2.5km to the west of the tip of the Dungeness peninsula. The point to the north was listed as being the minimum pass standard, whilst the point to the west was listed of a higher standard. As they are situated at a distance, these points may not accurately reflect the water quality immediately adjacent to the site ². The area of the site containing the main structures is in the EA fluvial/tidal Flood Zone 1 (so would be affected by floods less frequent than 1 in 1000 years). However, a small eastern area of the site lies within Flood Zones 2 and 3 (between 1 in 1000 and 1 in 200, and more frequent than 1 in 200, respectively) ³. Aqueous effluent discharges (and cooling water discharges during the operational phase) have always been made to the English Channel. This is achieved through the use of subsurface tunnels that connect to a submerged discharge structure located at a distance from the shore. The dispersion characteristics of the English Channel are affected by factors including flow rate, sediment load, 	<p>1. Ordnance Survey (2011) 1:25,000 Sheet 125, Romney Marsh 2. Environment Agency (2011) Bathing Water Quality 3. Magnox South (2009) Dungeness A EIAB</p>

	<p>sedimentation rate, tidal range and atmospheric conditions.</p> <ul style="list-style-type: none"> • Waterbodies containing clay mineral-rich sediments may have higher uptake potential for radionuclide anions such as Cs-137. • Dissolution of Magnox Fuel Element Debris (FED) has been undertaken at Dungeness A Site using the carbonic acid process for a number of years, and as such effluent bearing magnesium salts, metals and very low levels of radioactivity has been discharged on a continuous basis for this period of time. • Additionally, the Dover and Folkestone Water Company, which abstracts from the local aquifer, found that arsenic levels in the water extracted from the local water table were above recommended levels. As such, this arsenic is removed from via reverse osmosis and the resultant wastewater is discharged under permit from the Dungeness A effluent line³. • The dispersion characteristics of the English Channel are affected by factors including currents, sediment load (and type, as clay-rich sediments may have high uptake potential for radionuclide anions such as Cs-137), sedimentation rate, tidal range and atmospheric conditions 	
<p>Waste</p>	<ul style="list-style-type: none"> • Both operational and decommissioning activities at nuclear sites generate radioactive and conventional waste. • Low Level Waste (LLW) is generated at Dungeness A Site from a range of routine operational and decommissioning activities, and comprises a range of different materials. • The baseline for LLW is to package the waste and send it to the Low Level Waste Repository (LLWR) near Drigg in Cumbria for disposal¹. • Opportunities to characterise or decontaminate to Very Low Level Waste (VLLW) or exempt (for permitted landfill), size reduce, incinerate or metal melt, in order to reduce LLWR consignments, are actively sought¹. • Intermediate Level Waste (ILW) is generated from both operational and decommissioning activities. It has accumulated at several locations at Dungeness A Site. The majority of which will be retrieved during C&MP when an ILW store becomes available on site. The exception to this are some Miscellaneous Activated Components (MAC) stored in vaults in the concrete bioshield which will be retrieved during FSC¹. <p><u>Site Waste Strategy Baseline</u></p> <ul style="list-style-type: none"> • The use of self-shielding Ductile Cast Iron Containers (DCICs) for interim storage and eventual final disposal of solid and wet (which is dried within the container) ILW is being pursued by Magnox Ltd., and is to be implemented at Dungeness A Site. This is supported by generic and site-specific options studies, but will also be subject to regulatory approval. • The waste packages will be emplaced in the site ILW store for interim storage pending eventual phased transfer to the UK national Geological Disposal Facility (GDF) circa 2040 (but possibly as early as 2029)². • Dissolution of Magnox FED has been undertaken at Dungeness A since the late 1990s using a Carbonic Acid process. The bulk of the FED originating from the station's operational phase has been processed. The spent fuel elements that are being handled as part of the defuelling process are not being desplittered prior to dispatch to Sellafield, so no additional volume of FED is being produced at Dungeness A. 	<p>1. Magnox Ltd (2011) Dungeness A IWS 2. DECC (2011) Implementing Geological Disposal Annual Report April 2010 – March 2011</p>

<p>Traffic and Transport</p>	<ul style="list-style-type: none"> The site access road connects to the Romney Road via Lydd village. This road links to the national motorway network at Jct. 10, M20 via the A259 and A2070 trunk roads ¹. The nearest railhead to Dungeness A Site is located at the Denge railhead, which is at the head of a dedicated stretch of track that terminates in close proximity to the north of the site. This track is used only for the movement of nuclear materials, and joins the Marshlink branch line to the north. The nearest passenger rail station is located at Rye. Lydd (London Ashford) airport is located to the west of Lydd, approximately 6km north of the site. 	<p>1. Ordnance Survey (2011) 1:25,000 Sheet 125, Romney Marsh</p>
<p>Land Use and Material Assets</p>	<ul style="list-style-type: none"> Dungeness A Site occupies an area of 20 hectares ¹. The site consists of two reactor buildings, turbine hall, switch house, various ancillary buildings, access roads, grassy areas and areas of hardstanding. The surrounding area is rural in nature and is features residential developments and an NNR primarily. <ul style="list-style-type: none"> Notable uses in proximity to Dungeness A Site include several Public Rights of Way, a narrow gauge railway and cycle paths. Dungeness A Site incorporates a significant quantity of material that is potentially eligible for direct reuse or recycling: <ul style="list-style-type: none"> This includes a substantial quantity of recyclable metal in the turbine hall, the boilers, the gas ducts, the SPVs, and as rebar incorporated into large concrete structures such as the bioshield ². A proportion of this recyclable metal will be made available for recycling during the C&MP phase, such as the turbine hall deplanting and demolition and general building dismantling. The boilers, the primary circuit, the bioshield and the SPVs will be dismantled at FSC, so the majority of the recyclable metal on site will be produced at this time. A proportion of this material will be classified as ILW (activated reactor components in particular) so will likely not be suitable for recycling (and will likely be packaged and consigned to the GDF), but the remainder will be LLW or exempt, and as such eligible for recycling and reuse within or outwith the nuclear industry ². A large volume of inert concrete and masonry rubble will be produced through demolition activities during C&MP and FSC, and will likely be reused on- or off-site as infill material, or similar ². 	<p>1. Magnox Ltd (2011) Dungeness A – Facts and Figures. Available at http://www.magnoxsites.co.uk/our-sites/dungeness-a/facts-and-figures</p> <p>2. Magnox Ltd. (2011) Dungeness A Site IWS</p>
<p>Noise and Vibration</p>	<ul style="list-style-type: none"> The Baseline Noise Survey Data (L_{Aeq} 1 hour, dB(A) (Daytime)) (both A and B Site generating, 2003) is as follows: <ul style="list-style-type: none"> Old Coastguard – 50.2 Lloyds Cottage – 50.9 West Beach – 52.7 West Bungalow / Roundhouse – 45.6 Sunray – 49.1 Dunrunnin – 43.3 Beacholme – 44.1 	<p>1. Magnox South (2009) Dungeness A Site EIAB</p>

	<ul style="list-style-type: none"> • Helvetia – 41.5 • Peacehaven – 42.4 • Pleasant Cottage – 41.5 • Pearle Cottage – 43.1 • Garden Cottage – 45.7 • West View – 47.4 • Shinglenook – 43.0 • Coast Drive – 49.0 • Beach East – 59.4 • Beach West – 44.5 • RSPB – 40.5 • Dungeness B – 68.3 • The criteria for the significance of noise are the proximity of noise sources to the receptors, and the presence of any screening / nature of the ground between the source and the receptor . • Noise and vibration originate from a number of sources at Dungeness A Site. • Since the cessation of generation the profile of noise and vibration from the site has changed, but remains significant due to the nature of decommissioning works. 	
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Table 2: Environmental Discharge Data for Baseline Years 2008 – 10 for Dungeness A Site

In addition to the baseline information, which describes the permanent, semi-permanent and inherent features and impacts of Dungeness A Site and its surrounding area, the following table outlines discharge data for the site for particular years, and how these quantities will likely change in future. This is intended to provide a quantitative ‘snapshot’ of the features of the site and impact that it has (and is anticipated to have in future), in order to supplement the baseline information.

SEA Objective	Environmental Discharge Data	Future Changes in Environmental Discharges	References
Air Quality	<ul style="list-style-type: none"> The following describes the composition of radionuclides comprising the total radioactivity released by Dungeness A Site to atmosphere in 2008: <ul style="list-style-type: none"> 0.0347 TBq of H-3 (1.3 % of annual limits) 0.0011 TBq of C-14 (<1 % of annual limits) 5.21×10^{-5} TBq of beta (9.5 % of annual limits)¹ These 2008 discharges were assessed to result in doses to the critical group of 7.8 µSv (from consumption of milk, with infants as the most exposed group; 0.78 % of the public dose limit)². 	<ul style="list-style-type: none"> Discharges of radioactivity to the atmosphere decreased significantly upon the cessation of generation. Once defuelling is complete and decommissioning progresses through the C&MP phase, the trend will be for discharges to continue to remain steady or decrease. However, certain decommissioning activities such as the as the retrieval, treatment and passivation of wastes and draining of the pond may result in short term spikes in aerial discharges of radioactivity. Once the major hazard reduction projects have been completed and the site enters the extended, quiescent C&M phase, aerial discharges of radioactivity will be extremely low. The degassing of desiccant material in storage, bioshield concrete and core graphite may result in very minor discharges of tritium. Dust from demolition and traffic movement may affect the local area during all 3 decommissioning phases. Civil works will be a source of dust. FSC will result in a temporary increase in aerial discharges of radioactivity. This is because the radioactive reactor cores and associated equipment and infrastructure will be dismantled at this point. Detailed estimates for the discharges from this process have not been made, but will likely comprise particulate as major remaining structures are demolished. Retrieval of waste packages from site for transfer to the GDF when it becomes available during the C&M phase will result in traffic movements to the site. This 	<ol style="list-style-type: none"> FSA (2009) Radioactivity in Food and the Environment 14 Magnox North and South (2008) Monitoring Our Environment

		retrieval will likely be phased over an extended period of time, so the impact from this is likely to be limited.	
Global Climate Change and Energy	<ul style="list-style-type: none"> In 2010 11238 MWh of energy was used at Dungeness A Site¹. This energy consumption resulted in the indirect emission of 6959 tonnes of CO₂. No other indirect sources of CO₂ were identified¹. Use of the package boiler resulted in the direct emission of 1970.2 tonnes of CO₂¹. This gives a gross emission figure of 8929 tonnes of CO₂¹. 	<ul style="list-style-type: none"> The site will draw power from the grid and operate plant and vehicles for decommissioning works such as ILW processing and for general domestic needs until the completion of C&MP. During C&M the site's power usage will be very low, but periodic inspections and maintenance will result in very small spikes in energy usage. The retrieval of waste packages from the site ILW store during C&M will result in intermittent vehicle movements to and from the site. Energy use and the operation of numerous vehicles will resume on a significant scale during FSC. However, the types of the vehicles in use and the nature of energy mix in use in the UK at these dates cannot be predicted, thus the associated CO₂ emissions relative to the present are unknown. 	1. Magnox Ltd. (2010) Dungeness A NSP10
Surface Water Resources and Quality	<ul style="list-style-type: none"> The following describes the composition of radionuclides comprising the total radioactivity released by Dungeness A Site to the marine environment in 2008: <ul style="list-style-type: none"> 0.0951 TBq of H-3 (1.2 % of annual limits) 0.0236 TBq of Cs-137 (2.1 % of annual limits) 0.00816 TBq of other radionuclides (1 % of annual limits)¹. These discharges were assessed to result in doses to the critical group of 24 µSv (from external exposure and consumption of seafood; 2.4 % of the public dose limit)². 	<ul style="list-style-type: none"> Discharges of aqueous radioactivity will begin to decrease significantly upon the completion of the defuelling and the dispatch of all the spent fuel to Sellafield. As decommissioning progresses through the C&MP phase the trend will be for discharges to continue to decrease. However, certain decommissioning activities such as the as the retrieval, treatment and passivation of wastes, and dewatering of the pond may result in short term spikes in aqueous discharges of radioactivity. Once the major hazard reduction projects have been completed and the site enters the extended, quiescent C&M phase, aqueous discharges of radioactivity will be very low, but not zero³. It is possible that during the decades-long C&M phase percolating ground- and rainwater may entrain and mobilise activity from contaminated structures such as areas of the Safestore buildings³. Routine 	1. FSA (2009) Radioactivity in Food and the Environment 14 2. Magnox North and South (2008) Monitoring Our Environment 3. Hunt C. (2011) BPM for Water Management during C&M, Bradwell Site, BRAD/BPM/017 ^c

^c This document pertains specifically to Bradwell Site, but the assertions made in this report regarding water management and discharges during the C&M phase are applicable to the whole Magnox fleet.

		<p>monitoring and inspection will identify if this is occurring, and intervention will be undertaken in line with the requirements of the C&M Safety Case to ensure that any activity does not migrate off site.</p> <ul style="list-style-type: none"> FSC will result in temporary discharges of aqueous radioactivity, primarily from waste treatment as the radioactive reactor cores and associated equipment / infrastructure are dismantled. Detailed estimates for the discharges due to this have not been made, however. 	
<p>Waste</p>	<ul style="list-style-type: none"> The following waste metrics are for 2010: Dungeness A Site produced 77.7m³ of LLW from decommissioning activities which has been reused, recycled or disposed of¹. This entire volume consisted of combustible LLW that was treated¹. 166.9 tonnes of inert waste was produced by the site from decommissioning activities. 100% of this total was recycled¹. 1715 tonnes of non-hazardous waste was produced from decommissioning activities. 96.5% of this total was recycled¹. Both Reactors 1 and 2 are partially fuelled. Progress with defuelling is dictated by the available capacity of the Magnox Reprocessing Plant, given that spent fuel is being discharged from multiple sites. 	<ul style="list-style-type: none"> The anticipated future arisings of radioactive and conventional waste are outlined in Table 4. 	<p>1. Magnox South (2010) Nuclear Industry Sector Plan, Waste Metrics</p>

The following table illustrates further parameters that are significant for the site.

Table 3: Additional Data for baseline Year 2008 – 10 for Dungeness A Site

SEA Objective	Additional Data	Changes in Additional Parameters	References
Surface Water Resources and Quality	<ul style="list-style-type: none"> In 2010 the site consumed 130650 m³ of mains water. 	<ul style="list-style-type: none"> Water consumption at the site is likely to continue for the duration of the C&MP period at a similar level. 	1. Magnox Ltd. (2010) Dungeness A NSP10
Economy, Society and Skills	<ul style="list-style-type: none"> Dungeness A Site is located in a rural area of Shepway District, Kent. The major settlements within 10km of Dungeness A Site are Lydd to the northwest, New Romney and Lydd-on-Sea to the north, and a number of other smaller settlements¹. The population of Shepway District was 101200 during 2010². Shepway District had a working population of 48700 during 2010². <ul style="list-style-type: none"> The dominant working sectors in Shepway District during 2008 were and Public Administration, Education and Health (11400, 32 %) and Distribution, Hotels and Restaurants (8400, 23 %). In December 2010, 350 staff, 32 agency and 31 contractors and tenants* 106 staff, 10 project staff and contractors* were directly employed by Dungeness A Site³. Employment in the Electricity, Gas and Water Supply industry in Shepway District was not listed, but the effect of employment at Dungeness A Site is likely to be low against the total working population of this district. In 2010 (14900, 25 %) of the population were employed to NVQ4 level or above. Shepway District is not subject to Convergence Funding from the EU, or other external assistance⁴. <p>* Contractor numbers are variable, depending on the work being undertaken at the site.</p>	<ul style="list-style-type: none"> The number of personnel employed on site will decrease significantly after the completion of C&MP. Personnel numbers at the site will increase again for the duration of FSC. 	1. Ordnance Survey (2011) 1:25,000 Sheet 125, Romney Marsh 2. Office for National Statistics (2011) Official Labour Market Statistics, available at http://www.nomisweb.co.uk/ 3. Magnox Ltd (2011) Industrial Safety Stats @ December 2010 4. EU (2011) Cohesion Policy 2007 – 13, available at http://ec.europa.eu/regional_policy/atlas2007/index_en.htm

<p>Traffic and Transport</p>	<ul style="list-style-type: none"> The AADT from all traffic movements on the Lydd Road, just to the west of the junction with the site access road (on the route that gives access to the motorway) from recent measurements was 9857, of which 311 were HGV movements. At a separate count point on the Lydd Road, to the east of the access road junction in the village of New Romney, the AADT from all traffic movements was 10539, of which 235 were HGV movements. The proportion of these total movements that are directly attributable to Dungeness A Site is very low, and will continue to be so even during periods of increased work at the site. 	<ul style="list-style-type: none"> It is anticipated that general traffic and HGV movements will remain steady or increase during the remainder of the C&MP phase at Dungeness A Site. Movement of materials for potential future major construction or other projects e.g. delivery of DCICs to site, construction of the site ILW store will generate extra traffic movements, as will movement of demolition waste and other inert material for reuse or conventional disposal. A similar increase in traffic flows on local roads can be expected for the duration of the FSC phase. 	<p>1. Department for Transport (2011) Annual Average Daily Traffic Flows, http://www.dft.gov.uk/matrix/search.aspx</p>
<p>Health and Safety</p>	<ul style="list-style-type: none"> Dungeness A Site had 1 reportable Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) incident during 2010 The Occupational Safety and Health Administration Total Recordable Incident Rate (OSHA TRIR) for Dungeness A Site in December 2010 was 1.02 	<ul style="list-style-type: none"> The current Health and Safety regime will likely continue to be enforced for the remainder of the C&MP phase. Comparable Health and Safety standards to the current ones will likely be enforced during the periods of the C&M phase when personnel are on site for waste package retrieval activities, inspections etc. Comparable Health and Safety standards will likely be enforced during the FSC phase. 	<p>Magnox Ltd (2011) Industrial Safety Stats @ December 2010</p>

Table 4: Future Radioactive and Conventional Waste Arisings for Dungeness A Site ^d

Category of Waste	Time of Arising	Unpackaged Volume (m ³)
LLW	C&MP	1528.5
	C&M	108
	FSC	23362
ILW	C&MP	327
	C&M	0
	FSC	4187
Inert, hazardous and non-hazardous conventional	C&MP	55285.9
	C&M	0
	FSC	24187.2

(Dungeness A Site IWS, 2011)

^d Packaged volume is between 20 – 50% greater than the unpackaged volume, depending on the type of container and encapsulant applied (UK Radioactive Waste Inventory, 2007).

Main Environmental Issue for Dungeness A Site

Land Quality

- There is known non-radioactive (but no known radioactive) contamination at Dungeness A Site, resulting primarily from historical (during the generation phase) events.
 - Investigations undertaken recently have confirmed that there are no areas on the site that have been affected by significant radioactive contamination ⁴.
 - The chemically contaminated ground is associated with leaks and spills from the operational phase of the site. Hydrocarbon staining of gravels (to varying degrees at different depths) has been found at boreholes near to the turbine hall and Reactor 1 pond / Active Effluent Treatment Plant.
 - No active remediation has been applied to this contamination to date ⁴.
- Monitoring and investigation of land quality issues is ongoing at Dungeness A Site.

FED Dissolution

- Dungeness A is unique amongst the Magnox Sites in that it has an active Magnox FED dissolver, and has been undertaking this process since the 1990s. The site uses the Carbonic Acid process and discharges the resulting Mg-enriched effluent to the English Channel (after abatement).

Climate Change and Flooding

- As with all of the coastal Magnox Sites an ongoing issue for Dungeness A during the C&M phase is the vulnerability of the site to flooding due to more frequent storm surges and raised sea level brought about by the anticipated effects of climate change in the coming decades. This is due to the low lying nature of the site, which is immediately adjacent to the shoreline of the peninsula.
 - The C&M phase at the site, during which the reactors will be in Safestore, is scheduled to last until 2087, by which approximate time (2090-99) the Intergovernmental Panel Climate Change has projected that the worst case scenario (emission scenario A1FI) of sea level rise is in the range 0.26 – 0.59m (relative to 1990-99 levels) ². By 2105, an increase in 1 in 50 storm surge levels of between 0.27 and 0.87m, with a surge height of 6.49m has been predicted ³. The whole Dungeness Power Station site is protected by a 20m wide man-made shingle embankment along the shoreline, which has a height of approximately 11m, and forms a relatively steep shingle beach. This beach was created in 1965 as part of a beach management programme (in 1996 continuing maintenance of the bank required the use of 39000m³ of material) ¹.
 - Climate change-induced effects could accelerate beach profile erosion and shoreline retreat to the southwest of the site, and storm damage to the embankment is likely to become more frequent ¹. It was due to concerns regarding vulnerability of the site and surrounds to future sea-level changes which led to the rejection of the Dungeness Site by the Energy Secretary as a potential site for nuclear new build, in 2010. The Dungeness Site had previously been

shortlisted as one of the locations around the UK eligible for the construction of new reactors as part of national energy strategy.

- Any further measures necessary to prevent flooding of the site during the C&M period, such as improvements to the flood defences will be identified through the Periodic Safety Review. Furthermore, the rise in sea level during the C&M period will be gradual, allowing the advance planning of any necessary mitigation measures.

1. British Energy [2008] Proposed Nuclear Development at Dungeness – Environmental Scoping Report
2. IPCC [2007] Projections of Future Change in Climate, http://www.ipcc.ch/publications_and_data/ar4/wg1/en/spmsspm-projections-of.html
3. Meteorological Office [2007] Review of medium to long term coastal risks associated with British Energy Site: Climate Change Effects
4. Magnox Ltd. (2011) Dungeness A Site EIAB

Figure 1: Special Area of Conservation in the Vicinity of Dungeness A Site

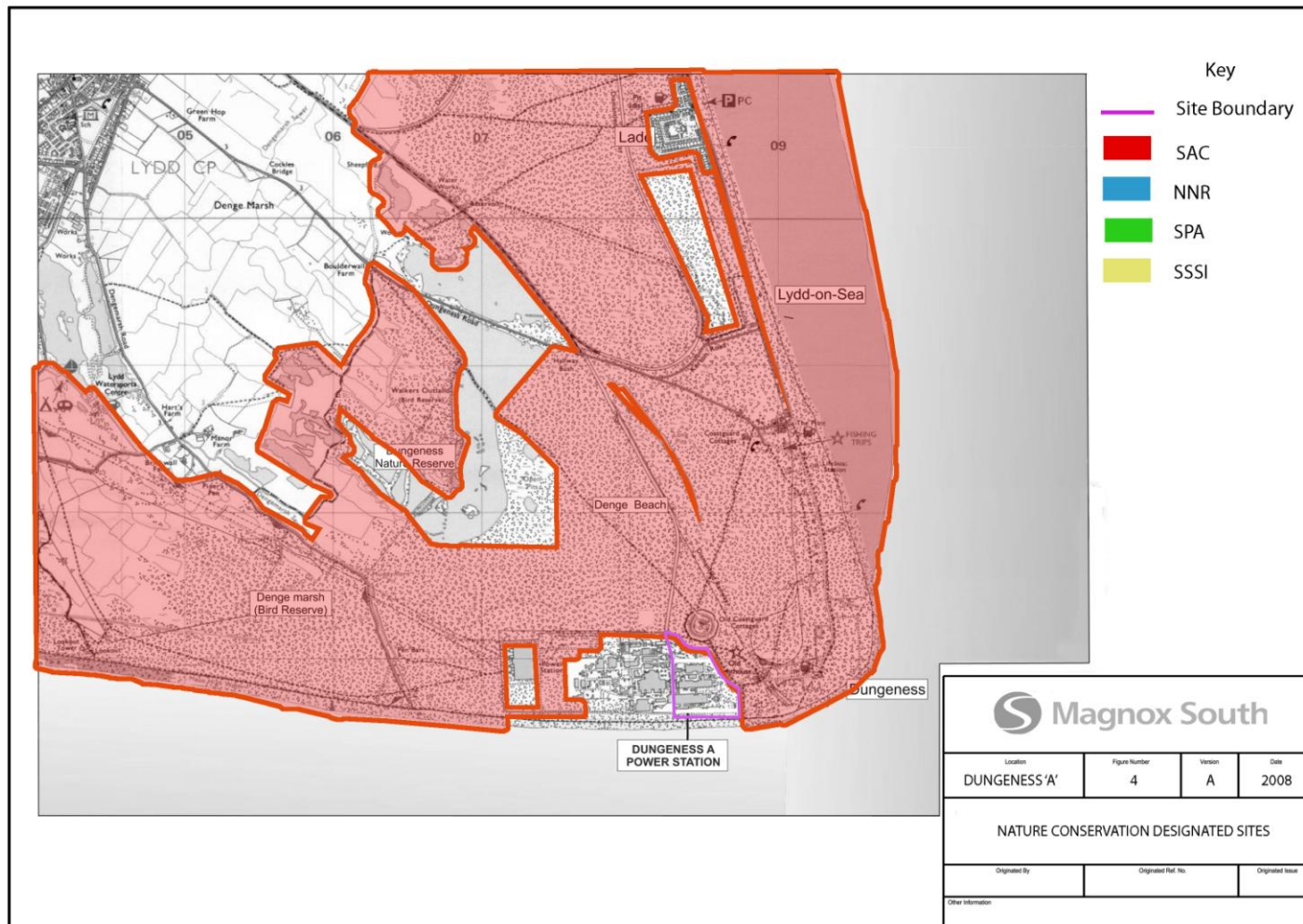


Figure 2: Special Protection Area in the Vicinity of Dungeness A Site

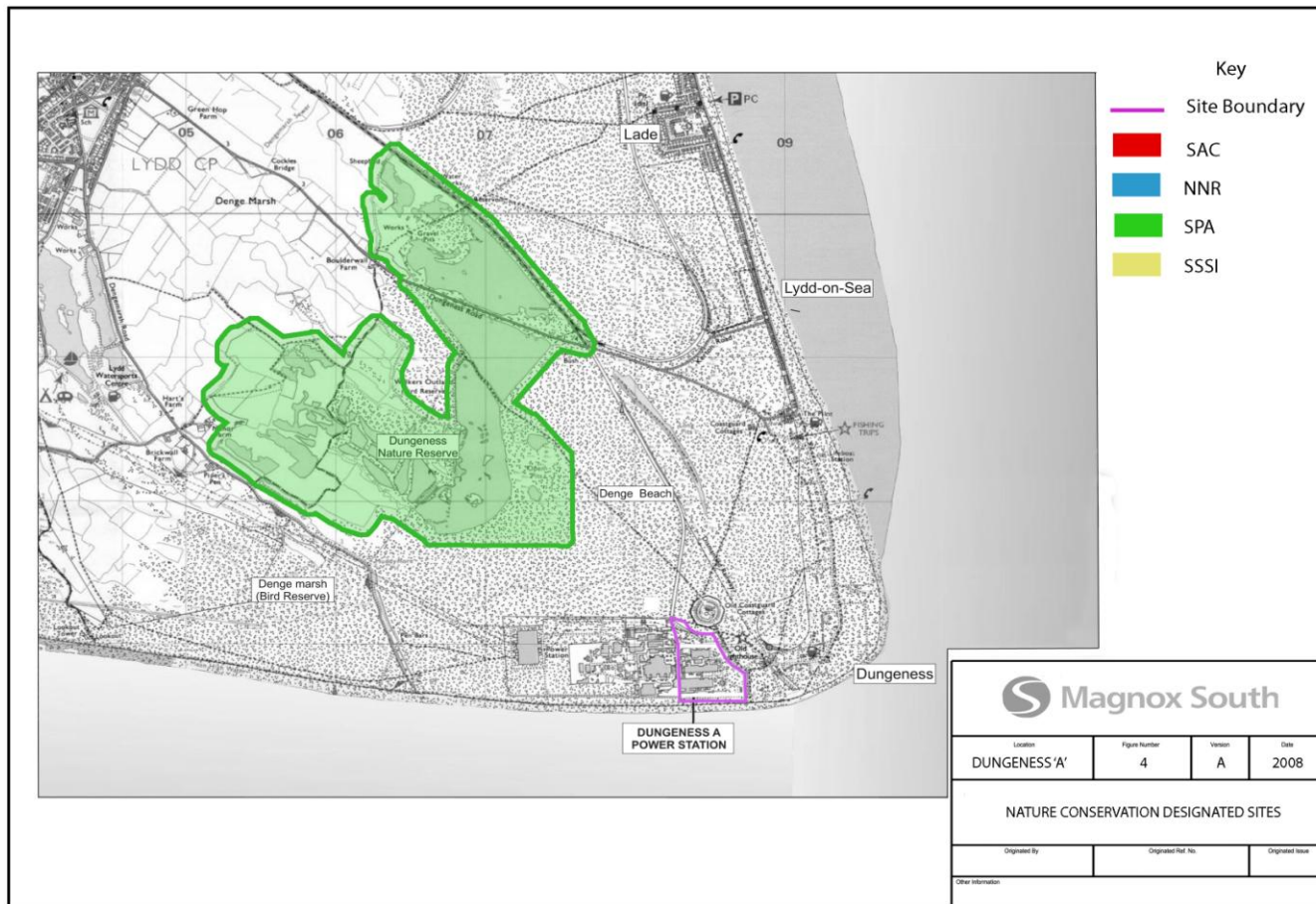


Figure 3: Site of Special Scientific Interest in the Vicinity of Dungeness A Site

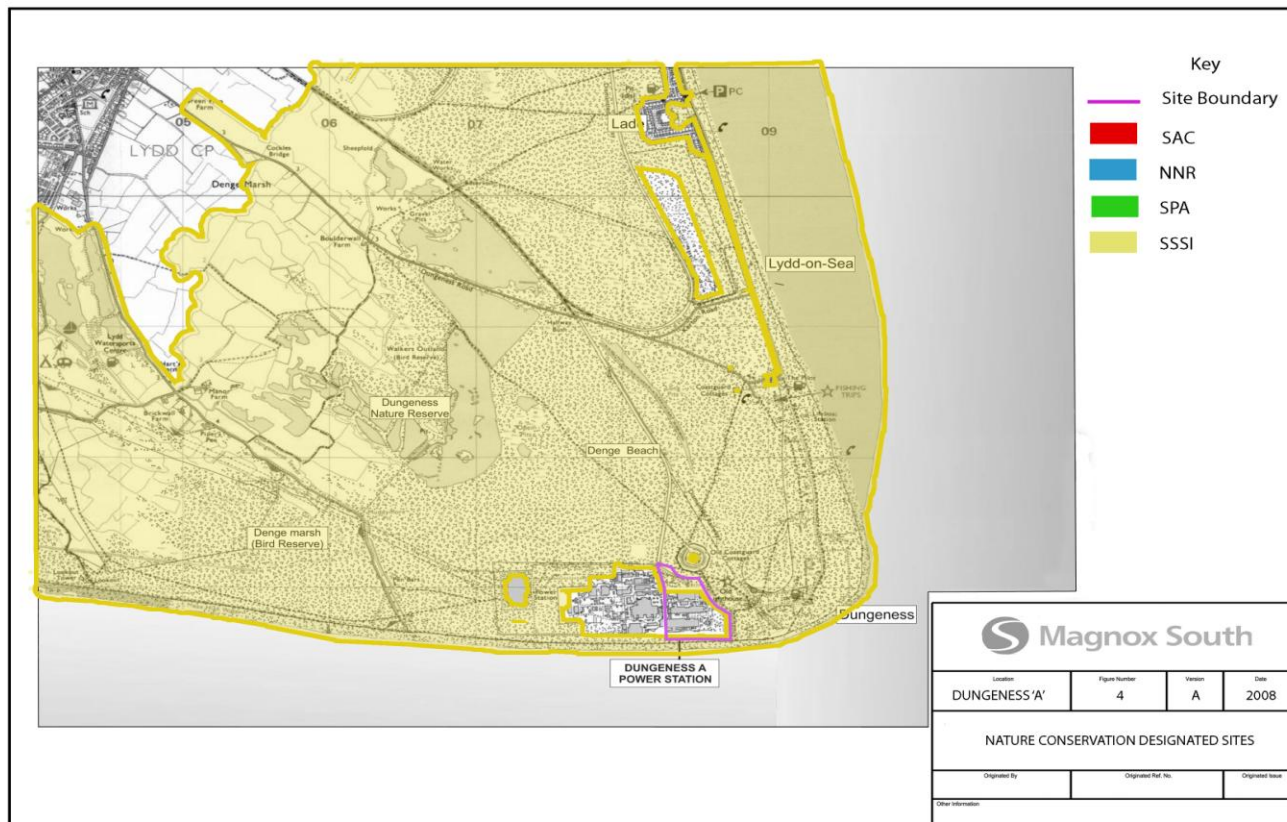


Figure 4: National Nature Reserve in the Vicinity of Dungeness A Site

