Magnox

Strategic Environmental Assessment
Site Specific Baseline

Oldbury 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

Oldbury Site
Oldbury Naite
Thornbury
South Gloucestershire
BS35 1RQ

Oldbury Site

Oldbury Site is an operational twin reactor Magnox station located in South Gloucestershire, South West England. It is situated on the eastern bank of the River Severn, from which it draws cooling water supplies using a large tidal lagoon that extends from the river bank. This power station site covers an area of 71 hectares [1]. The following describes the key dates for Oldbury Site:

- Construction of Oldbury Site commenced in 1961, and electricity was first supplied to the grid in 1967 [1]. Oldbury is currently the oldest operating nuclear power station in the world [2].
- The site is planned to cease electricity generation in 2012 [1] [a] after 45 years of operation.
- Defuelling of the reactors is scheduled to be completed by 2013 [1].
- The Care and Maintenance Preparations (C&MP) phase of the decommissioning process is scheduled to be completed in 2025 at which point the site will enter the Care and Maintenance (C&M) phase [2].
- Final Site Clearance (FSC) is scheduled to commence at the end of the C&M phase. All remaining structures on the site cleared by 2103 [2].

1. Magnox Ltd (2011) Oldbury – Facts and Figures. Available at http://www.magnoxsites.co.uk/our-sites/oldbury/facts-and-figures
2. Magnox Ltd. (2011) Oldbury Site – Impact of MODP

[a] Reactor 2 (R2) was permanently shut down in June 2011, having reached its core irradiation limit. The Generation Optimisation 3 programme secured a further four months of generation on Reactor 1 (R1) through the use of Inter-Reactor Transfer (IRX). IRX will allow partially irradiated fuel from R2 to be transferred to R1, where the remaining fissile content of this fuel will be used (fully irradiated fuel from R1 is transferred to R2 for temporary storage). The 32.0 GWd/t core irradiation limit for R1, as set by the Office for Nuclear Regulation (ONR), is anticipated to be reached in February 2012, at which point the station will cease generation.

Site End State Assumption

The planned end state for Oldbury 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 Oldbury Site

SEA Objective	Environmental Baseline Data	References
Air Quality	Radioactive Discharges • As one of the later Magnox stations, Oldbury's reactor cores are enclosed within Pre-stressed Concrete Pressure Vessels (PCPVs, which also serve as radiation 'bioshields'), so airborne activation products are not produced and vented from the bioshield void continuously as part of ordinary operations. • Periodic venting of reactor coolant gas is carried out as part of operations, including refuelling of the reactors. This will cease when generation ends in 2012. • Nuclear operations such as ponds ventilation, waste retrieval and others that occur during operations and also as part of decommissioning works result in minor but regular aerial discharges of radioactivity. Conventional Discharges • Vehicles, diesel generators and gas turbines are employed on Oldbury Site, which are sources of air quality contaminants including NO_x (oxides of nitrogen), SO_x (oxides of sulphur), O_3 (ozone) and PM_{10} (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 Climate Change and Energy	• Throughout its lifetime Oldbury 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 are driven by power derived directly from the station's output). The use of this energy has resulted in indirect CO_2 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 Oldbury Site this auxiliary equipment consists of 3 gas turbines (2 operational, 1 backup) and diesel generators. These machines are not in constant use; instead they are there for emergencies, but are regularly run for testing purposes. • 24 vehicles (plus six lease vehicles) are based at Oldbury 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 carried out on behalf of Berkeley Site in addition), and have associated carbon emissions. Indirect carbon emissions originate from the use of hire vehicles by site personnel when travelling on company business in addition. • The site incinerator, which is used for combustible LLW, is also a source of CO_2 emissions. • 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. • Additionally, Oldbury's combustion plant is covered by the EU Emissions Trading Scheme.	

Biodiversity, Flora and Fauna	• Oldbury Site is situated in a predominantly rural setting, and has 4 designated areas in close proximity.
	• These designations recognise the fact that the Severn is an important habitat for migratory fish and birds, with the inter-tidal mudflats being of key importance to the migration of several internationally-protected bird species [1].
	• These designated areas are:
	  • Severn Estuary Site of Special Scientific Interest
	  • Severn Estuary Special Area of Conservation
	  • Severn Estuary Special Protection Area
	  • Severn Estuary Ramsar [1].
	• Due to these designations the coastline adjacent to Oldbury is also classified as the Severn Estuary 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 an annual 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 Wales [2].
		1. Magnox North (2010) Oldbury Site Environmental Impact Assessment Baseline (EIAB)
		2. Environment Agency (2002) Impact Assessment of Ionising Radiation on Wildlife
		3. Natural England (2011) England's European Marine Sites, available at http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/europeansites.aspx

Landscape and Visual	• Oldbury Site is located on the eastern bank of the River Severn [1]. • The surrounding landscape is a semi-open and flat estuarine flood plain environment. Higher ground is situated at a distance to the east (Severn Ridges Character Area) and to the west on the opposite bank of the River Severn [2]. • The site is a prominent feature in the local landscape, being highly visible from multiple locations in close proximity and at medium-long distances including nearby villages and from the Severn Bridge [2].	1. Ordnance Survey (2011) 1:25,000 Sheet 167, Thornbury, Dursley and Yate 2. Magnox North (2010) Oldbury Site EIAB
Cultural Heritage	• There are 3 Scheduled Ancient Monuments near to Oldbury Site, at Rockhampton, Oldbury-on-Severn and at Stroat. • There are a large number of Listed Buildings near to Oldbury Site, including the Severn Bridge • There are 4 entries in the draft Register of Landscapes, Parks and Gardens of Special Historic Interest; Tortworth Park, Whitcliff Park, Berkeley Castle, and Thornbury Castle as listed by Natural England near to Oldbury Site. • The reactors at Oldbury were the first in the Magnox Programme to use PCPVs, so represented a considerable technical advance over the previous stations and paved the way for the subsequent AGR Programme. Despite this industrial heritage, there are no known plans to preserve any physical part of the station after shutdown.	Magnox North (2010) Oldbury Site EIAB

[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.

Groundwater, Geology and Soils	• Made ground immediately underlies much of the site, and consists primarily of reworked mudstone and estuarine alluvium. The natural superficial deposits in the Oldbury Site locality consist of Quaternary Alluvium, which is a soft to stiff clay that is sandy in areas, and contains occasional gravel and peat layers. • The uppermost bedrock unit at Oldbury Site consists of Permo-Triassic Mercia Mudstone, a predominantly red sandstone with siltstones and halite layers. Evaporite beds and mudstones are also present. This whole unit is further subdivided into several distinct layers. The uppermost is a weathered layer consisting of lithorelicts in a clayey matrix, a leached layer with cavities left by gypsum dissolution, an unleached layer containing gypsum nodules within the silt- and sandstones, and a basal conglomerate. The Devonian Old Red Sandstone underlies the Permo-Triassic rocks, and consists of a very thick deposit of red brown silt- and sandstones. • The superficial deposits at Oldbury Site are considered a non-aquifer • The Mercia Mudstone and the Old Red Sandstone bedrock facies are both considered to be Minor Aquifers. The aquifer within the Mercia Mudstone is banded ('multi-aquifer system'), with groundwater located within the sandstones, and prevented from movement between these bands by the silt- and mudstones. • There is 1 licenced abstraction borehole on the site (with a further 11 within 5km of the site), but this borehole is not in regular use. • The soil in the area surrounding Oldbury Site is classified as loamy / clayey soils characteristic of coastal flats, and is classified as a Grade 3 agricultural quality soil. <u>Land Quality</u> • Oldbury Site is considered to have limited radioactive and conventional land contamination. • One area of land contaminated by radioactivity has been identified, associated with the Pond Water Cooler (PWC) leak that was discovered in 1976. This has resulted in limited soil contamination and a volume of contaminated groundwater that is small, stable and confined under current conditions. • The localised areas of land affected by conventional contamination generally arose from losses and spillages of hydrocarbons during the operational phase, and potentially from the authorised disposal of material during the construction and operational period. • A new suite of monitoring boreholes was installed at Oldbury Site in 2008 to improve the groundwater monitoring programme which continues to closely monitor the PWC contamination at site.	Magnox North (2010) Oldbury Site EIAB
Surface Water Resources and Quality	• The nearest water course to Oldbury Site is the River Severn. Oldbury Pill discharges to the Severn approximately 1.5 km to the south of the site [1]. • The ecological and chemical status of Oldbury Pill is considered poor under the Water Framework Directive [2]. • Aqueous effluent and cooling water discharges are made to the River Severn via a culvert that runs underneath the tidal reservoir to the central part of the river channel (which maximises dispersion). • Due to the high sediment load in the Severn, the tidal reservoir becomes heavily silted. This necessitates periodic dredging of the area of the tidal reservoir around the cooling water intake to ensure that the supplies of water (and hence nuclear safety) are not jeopardised. Silt is dredged and pumped into lagoons adjacent to the station (entrained water is discharged back to the river), three of which have been used through the station's operational lifetime. Two lagoons to the immediate north of the station have been filled to capacity and have been delicenced and reinstated, whilst Lagoon 3 to the immediate south of the station is currently in use. • As part of the delicensing project carried out in 2009/10 to sell the land to the north of the station, statistical analysis of district survey data revealed this area of land, formed of river silt, to not be radioactively contaminated. As such, these	1. Ordnance Survey (2011) 1:25,000 Sheet 167, Thornbury, Dursley and Yate 2. Environment Agency (2011) Water Framework Directive – River Basin Management Plans – Rivers

	results demonstrate that impact of the station on river sediments can be deemed to be very low, even in close proximity to the station. • The operational silt lagoon incorporates a liner in order to prevent saline intrusion into the local water table from the brackish water pumped from the tidal reservoir. A periodic monitoring programme (coinciding with dredging operations) in boreholes and surface ponds adjacent to the lagoon ensures that saline concentrations in the groundwater do not reach levels of concern. • Although the Severn adjacent to Oldbury Site is brackish and tidal, it is not considered to be the Severn Estuary at that point, as this is generally taken to be everything south of the Severn Bridge, which is located approximately 6km to the south of the site. • The dispersion characteristics of the River Severn are affected by factors including flow rate, sediment load, sedimentation rate, freshwater / seawater mixing rate and tidal range and atmospheric conditions. • Waterbodies containing clay mineral-rich sediments may have higher uptake potential for radionuclide anions such as Cs-137.	
Waste	• Both operational and decommissioning activities at nuclear sites generate radioactive and conventional waste. • Silt lagoon 3 is classified by the EA as a landfill (non-hazardous). Seaweed and other organic matter that is removed from the filters on the station's cooling water intake is disposed to the lagoon. An alternative management route for river-derived putrescible wastes has been developed and these wastes are not taken to a local composting facility, in order to potentially allow a future reclassification of the lagoon. • LLW is generated at Oldbury 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 near Drigg in Cumbria for disposal. • 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 sought. • Intermediate Level Waste (ILW) is generated from both operational and decommissioning activities. It has accumulated at several locations at Oldbury 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 PCPVs which will be retrieved during FSC. <u>Site Waste Strategy Baseline</u> • 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 Oldbury 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]. • The Magnox Fuel Element Debris (FED) waste stream has a volume of 410m^3 [3]. There is a Best Practicable Environmental Option (BPEO) study that has identified dissolution as the preferred management option for this waste stream.	1. Magnox Ltd (2011) Oldbury IWS 2. DECC (2011) Implementing Geological Disposal Annual Report April 2010 – March 2011 3. Walters S (2009) Fuel Element Debris Status Overview

Traffic and Transport	• The site access road connects to the A38 trunk road directly or via Thornbury. This road links to the national motorway network at Jcts. 14 (northbound) and 16 (southbound, and for direct access to M4), M5. • The nearest railhead to Oldbury Site is located on the Sharpness Branch Line near to Berkeley Site (which is operational but infrequently used). The nearest passenger rail station is Yate station.	1. Ordnance Survey (2011) 1:25,000 Sheet 167, Thornbury, Dursley and Yate
Land Use and Material Assets	• Oldbury Site occupies an area of 71 hectares [1]. • 150 hectares of NDA-owned land adjacent to the site was acquired by Horizon Nuclear Power in 2009 for the potential future construction of a 'B' power station site [2]. • The site consists of a single reactor block, turbine hall, ILW vaults, various ancillary buildings, access roads, grassy areas and areas of hardstanding. • The surrounding area is rural in nature and is used primarily for agricultural and recreational purposes • Notable uses in proximity to Oldbury Site include the Severn Way footpath, which runs through the Site footprint (between the main reactor area and the cooling water forebay complex). • Oldbury Site incorporates a significant quantity of material that is potentially eligible for direct reuse or recycling once generation has ceased and the site is undergoing decommissioning: • This includes a substantial quantity of recyclable metal in the turbine hall, the reactor internals (boilers, pressure vessel liner) and incorporated into the PCPVs (stressing cables, Pressure Vessel Cooling System pipework), and large devices such as the gas circulators [3]. • A proportion of this recyclable metal will be made available for recycling during the C&MP phase, such as from the turbine hall deplanting and demolition and other general building dismantling. • The PCPVs and their contents 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 [3]. • 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 [3].	1. NDA (2011) Strategy Document 2. Horizon Nuclear Power (2011) http://www.horizonnuclearpower.com/oldbury 3. Magnox Ltd. (2011) Oldbury Site IWS
Noise and Vibration	• The Baseline Noise Survey Data ($L_{Aeq\ 1\ hour}$, dB(A) (Daytime)) (during C&MP) is as follows: • Jobsgreen Farm – 50.5 • Knight Farm – 47.2 • Lowgoods Farm – 45.0 • Riding School – 47.7 • Houses in Oldbury Naite – 46.2	1. Magnox North (2010) Oldbury Site EIAB

	• Vine Farm – 41.0 • Oldbury House – 40.5 • Houses on Ham Lane – 41.2 • Houses on Chapel Road – 41.6 • Houses in Oldbury on Severn – 40.5 • Houses on Westend Lane – 43.2 • Houses on Hill Lane – 41.3 • Brick House Farm – 43.2 • Shepperdine Farm (North) – 44.7 • Nupdown Farm – 39.9 [1] • 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 Oldbury Site.	

Table 2: Environmental Discharge Data for Baseline Years 2008 – 10 for Oldbury Site

In addition to the baseline information, which describes the permanent, semi-permanent and inherent features and impacts of Oldbury 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	• The following describes the composition of radionuclides comprising the total radioactivity released by Oldbury Site to atmosphere in 2008: • 1.59 TBq of H-3 (18 % of annual limit) • 0.93 TBq of C-14 (23 % of annual limit) • 2.94 x 10^{-5} TBq of beta (29 % of annual limit) [1]. • These 2008 discharges were assessed to result in doses to the critical groups of 22 µSv (from consumption of milk and vegetables, with infants as the most exposed group; 2.2 % of the public dose limit) [c 2].	• Discharges of radioactivity to the atmosphere will decrease significantly upon the cessation of generation. • As decommissioning progresses through the C&MP phase the trend will be for discharges to remain steady or continue to 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	1. FSA (2009) Radioactivity in Food and the Environment 14 2. Magnox North and South (2008) Monitoring Our Environment

[c] This is a combined figure for Berkeley and Oldbury Sites, as the radiological impact of these stations is assessed together due to their spatial proximity.

		extremely low. • The degassing of desiccant material in storage, the PCPV 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 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	• In 2010 121900 MWh of energy was used at Oldbury Site. • This figure is much higher than at defuelling / decommissioning sites due to 'works usage' i.e. energy consumed continuously by heavy plant items that facilitate generation such as the gas circulators and cooling water pumps. This power requirement is deducted from the output of the station. • Use of the plant including the gas turbines and the incinerator resulted in the direct emission of 116 tonnes of CO_2 [1]. • 0 tonnes of CO_2 were indirectly emitted from domestic energy consumption. 69.3 tonnes of CO_2 were emitted from other indirect sources [1]. • This gives a gross emission figure of 116 tonnes of CO_2 [1].	• 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 CO_2 emissions relative to the present are unknown.	1. Magnox Ltd. (2010) Oldbury NSP10

Surface Water Resources and Quality	• The following describes the composition of radionuclides comprising the total radioactivity released by Oldbury Site to the estuarine environment in 2008:
	  • 0.184 TBq of H-3 (18 % of annual limit)
	  • 0.309 TBq of Cs-137 (44 % of annual limit)
		• Discharges of aqueous radioactivity will decrease significantly upon the cessation of generation and 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
			1. FSA (2009) Radioactivity in Food and the Environment 14
			2. Magnox North and

	• 0.127 TBq of other radionuclides (18 % of annual limit) [1]. • These 2008 discharges were assessed to result in doses to the critical groups of 20 μSv (from external exposure; 2 % of the public dose limit) * [2]. * This is a combined figure for Berkeley and Oldbury Sites, as the FSA assesses the radiological impact of these stations together due to their spatial proximity.	decrease. • However, certain decommissioning activities such as the retrieval, treatment and passivation of wastes 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 zero [3]. • 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 buildings [3]. Routine 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. • 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.	South (2008) Monitoring Our Environment 3. Hunt C. (2011) BPM for Water Management during C&M, Bradwell Site, BRAD/BPM/017 [d]
Waste	• The following waste metrics are for 2010: • Oldbury Site produced 91.4m^3 of LLW from operational activities which has been reused, recycled or disposed of [1]. • 36.9m^3 of combustible LLW was treated, 35m^3 of compactable LLW was treated and 19.5m^3 of LLW was disposed to LLWR [1]. • 92385 tonnes of inert waste was produced by the site from operational activities. 100% of this total was recycled [1]. • 3764.7 tonnes of non-hazardous waste was produced from operational activities. 92% of this total was recycled [1]. • R1 is operational, defuelling has yet to commence on R2 so no waste is currently being discharged from the reactors [2].	• The anticipated future arisings of radioactive and conventional waste are outlined in Table 4.	1. Magnox Ltd. (2010) Oldbury NSP10 2. Magnox Ltd. (2011) Oldbury Site IWS

[d] 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.

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

Table 3: Additional Data for baseline Year 2010 for Oldbury Site

SEA Objective	Additional Data	Changes in Additional Parameters	References
Surface Water Resources and Quality	• In 2010 the site consumed 250455 m^3 of mains water [1]. • This figure excludes cooling water, which is drawn directly from and returned to the River Severn via its own isolated cooling water (tertiary) circuit [1].	• Water consumption will drop significantly upon the cessation of generation.	1. Magnox Ltd. (2010) Oldbury NSP10
Economy, Society and Skills	• Oldbury Site is located in a rural area of South Gloucestershire. • The major settlements within 10km of Oldbury Site are Thornbury and Alveston to south east, Berkeley to the north west, and Almondsbury to the south. There are numerous small villages and settlements in the area in addition to these larger towns [1]. • The population of South Gloucestershire was 264800 during 2010 [2]. • South Gloucestershire had a working population of 142700 during 2010 [2]. • The dominant working sectors in South Gloucestershire during 2008 were Finance, IT and other Business Activities (34800, 25 %) and Public Admin, Education and Health (33600, 24 %). • In December 2010, 425 staff, 1 project employee and contractors* were directly employed by Oldbury Site [3]. • Employment in the Electricity, Gas and Water Supply industry in South Gloucestershire was not listed, but the effect of employment at Oldbury Site is likely to be low against the total working population of this district. • In 2010 (47400, 28 %) of the population were employed to	• 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 167, Thornbury, Dursley and Yate 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

	NVQ4 level or above. • South Gloucestershire is not subject to Convergence Funding from the EU, or other external assistance [4]. * Contractor numbers are variable, depending on the work being undertaken at the site.		
Traffic and Transport	• The Annual Average Daily Traffic (AADT) from all traffic movements on the A38 (at a count point close to the south of where the local road from the site joins the A38 to the south of site) from recent measurements was 19965, of which 535 were Heavy Goods Vehicles (HGV) movements. • On the M5, close to the north of Jct. 14 the AADT from all traffic movements was 75487, of which 8662 were HGV movements. • The proportion of these total movements that are directly attributable to Oldbury Site is very low, and will continue to be so even during periods of increased work at the site.	• It is anticipated that general traffic and HGV movements will remain high, or increase during the C&MP phase at Oldbury 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 during the FSC phase.	Department for Transport (2011) AADF Home, available at: http://www.dft.gov.uk/matrix/search.aspx
Health and Safety	• Oldbury Site had 1 reportable Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) incidents during 2010 • The Occupational Safety and Health Administration Total Recordable Incident Rate (OSHA TRIR) for Oldbury Site in 2010 was 0.53	• 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.	Magnox Ltd (2011) Industrial Safety Stats @ December 2010

Table 4: Future Radioactive and Conventional Waste Arisings for Oldbury Site [e]

Category of Waste	Time of Arising	Unpackaged Volume (m^3)
LLW	C&MP	5069.6
	C&M	136
	FSC	17948.4
ILW	C&MP	760.6
	C&M	0
	FSC	3872.8
Inert, hazardous and non-hazardous conventional	C&MP	187694.4
	C&M	0
	FSC	80131

(Oldbury Site IWS, 2011)

[e] 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 Oldbury Site

Land Quality

- There is limited radioactive contamination at Oldbury Site resulting primarily from a single historical event, as well as several radiological and non-radiological (Areas of Potential Concern) APCs from historical events and from during the construction period.
- The radioactively contaminated soil and groundwater is associated with the 1976 Pond Water Cooler pipework leak. A cast iron transfer pipe leaked active liquor from the pond which escaped from the sump into the surrounding bedrock. This resulted in a small area of contaminated ground and groundwater which is stable and confined within the RCA.
    - A new suite of boreholes was constructed in 2008 into both the superficial deposits and the Mercia Mudstone (multi-aquifer system), inside and outside the site RCA, in order to monitor the contamination plume originating with this event.
    - Groundwater monitoring is carried out on a quarterly basis to monitor radionuclide distributions and to ensure that the contamination is not migrating.
- Other potential sources of radiological and non-radiological contamination include the North Road Soil Disposal Area, Splitter Flask Corridor, Original Effluent Discharge Line, Flask Route, Former Circulator Oil Storage and Diesel Generator / Switchgear Compound.
- However, intrusive investigation has not identified significant contamination by either radioactive or non-radioactive contaminants at APCs other than the PWC leak area.

FED Dissolution

- Following a BPEO study dissolution has been identified as the optimal treatment method for the Magnox FED waste currently in storage in the vaults on site. The technology to be used in order to implement this has not yet been determined. The decision on which technology (mainly which acid is used for the processing) will be made based upon the most suitable method used at other Magnox Sites.
    - If this process is implemented, the resultant effluent will be discharged to the River Severn as per all other aqueous discharges from the site. The radiological and conventional environmental impacts of these discharges will be duly managed through abatement measures and considered through an Environmental Risk Assessment supported by modelling and dispersion studies as required.

Climate Change and Flooding

- As with all of the coastal Magnox Sites an ongoing issue for Oldbury Site during the C&M phase is the vulnerability of the site to flooding due to raised sea level and more frequent storm surges brought about by the anticipated effects of climate change

in the coming decades. Oldbury Site is situated on the low-lying flood plain of the River Severn, which is highly tidal at that location and historic instances of storm surge flooding (Bristol Channel Flood 1607) means that the site is potentially vulnerable.

- The C&M phase at the site, during which the reactors will be in Safestore, is scheduled to last until 2092, by which approximate time (2090-99) the Intergovernmental Panel on 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) [1]. The site is situated at an elevation of 10m above Ordnance Datum (mAOD) and the flood defences at Oldbury consist of a grass covered embankment up to 2m high above the adjacent natural ground level, with stone pitching (to withstand erosion) between the site and the foreshore [2].
- 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. IPCC (2007) Projections of Future Change in Climate, http://www.ipcc.ch/publications_and_data/ar4/wg1/en/spmsspm-projections-of.html
2. British Nuclear Group (2007) Oldbury Site EIADR Environmental Statement

Figure 1: Statutorily Designated Areas in the Vicinity of Oldbury Site