

Magnox Limited

Oldbury Site

Environmental Management Plan (Decommissioning)

Issue Fifteen 2022



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EXECUTIVE SUMMARY

In March 2007, Magnox Electric Ltd (now Magnox Limited) applied to the Health and Safety Executive (HSE) for consent to decommission Oldbury Power Station in accordance with the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 (as amended). An Environmental Statement accompanied the application.

After a period of public consultation, the HSE, now the Office of Nuclear Regulation (ONR), duly granted consent in February 2008. Conditions were attached to the consent, including one relating to the production and maintenance of an Environmental Management Plan covering the ongoing mitigation measures to prevent, reduce and, if possible, offset any significant adverse environmental effects of the decommissioning work.

The Plan is to be re-issued by the site licensee annually or at intervals agreed with the ONR. This document is the fifteenth issue of Oldbury Site's Environmental Management Plan.

As Site Closure Director for Oldbury, I look forward to a successful decommissioning project and on behalf of Magnox Limited I give my commitment to minimising any adverse effect on the environment as a consequence of our decommissioning operations.

Mike Heaton

Site Closure Director



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1. Introduction

Oldbury Power Station (hereafter Oldbury Site) ceased generation of electricity on 29th February 2012 and shortly thereafter began defuelling. Prior to commencing this work Magnox Limited, the Licensee of the site, is legally required to seek consent from the Office of Nuclear Regulation (ONR), formerly the Health and Safety Executive (HSE), to carry out the decommissioning project.

An application was therefore made in March 2007 to the Health and Safety Executive (HSE) (hereafter ONR) for consent to carry out the decommissioning project at Oldbury. In support of this application, an Environmental Statement^{1,2} was provided, which assessed the impacts of the project on the environment. Following an extensive public consultation, the ONR granted consent to carry out the decommissioning project at Oldbury in February 2008, subject to certain conditions. The conditions are listed in full within the Consent in Appendix A.

Condition number 2 requires the licensee of the site to prepare and implement an Environmental Management Plan (EMP) to cover mitigation measures to prevent, reduce and where possible offset any significant adverse effects on the environment. "The EMP shall:

- *list the mitigation measures that are already identified in the environmental statement and evidence submitted [to the ONR] to verify information in the environmental statement; and*
- *list the work activities where mitigation may be required but where assessments to identify mitigation measures will only be possible in the future."*

It is a requirement of the conditions attached to the consent to describe the effectiveness of the mitigation measures over time. This EMP is therefore a living document that will be periodically reviewed and revised throughout the decommissioning project. The EMP will be reissued annually or at other intervals agreed with the ONR. Future submissions will include a summary of the effectiveness of the mitigation measures over the previous 12 months.

Further information on the ONR's decision to grant consent to decommission Oldbury can be found in their decision report, which describes the content of the conditions attached to the Consent and the main reasons and considerations for the decision.

On 22nd March 2016 the Office of Nuclear Regulation (ONR) confirmed that the site had taken reasonable steps to prove that the site is free of Magnox fuel and as a result the site was declared as a fuel free site. In accordance with Government Policy, work is now well underway to systematically remove (or decommission) the plant and buildings associated with electricity generation at the site.

¹ European Council Directive 85/337/EEC, as amended by Council Directive 97/11/EC, sets out a framework for the assessment of the effects of certain public and private projects on the environment. The Directive is implemented in Great Britain for decommissioning nuclear reactor projects by the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 (as amended).

² British Nuclear Group (2007) Oldbury Nuclear Power Station Environmental Statement (in support of the application to decommission Oldbury Nuclear Power Station as required by Statutory Instrument 1999 No. 2892: Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 (as amended).

Copies of the decision report document are available from:

Office for Nuclear Regulation
4N.1 Redgrave Court
Merton Road
Bootle
Merseyside
L20 7HS

Email: onrenquiries@onr.org.gsi.gov.uk

Internet: www.onr.org.uk

Any queries relating to the decommissioning activities at Oldbury or requests for copies of this EMP should be addressed to:

Environment Team
Oldbury Site
Oldbury Naite
Thornbury
South Gloucestershire
BS35 1RQ

This EMP is also available to the public at www.gov.uk/government/organisations/magnox-ltd

2. Scope of the Environmental Management Plan

This EMP details the mitigation measures to prevent, reduce and where possible offset any significant adverse effects on the environment throughout the decommissioning of Oldbury. The decommissioning project at Oldbury is divided into three phases as described in Box 1.

Box 1: Summary of the decommissioning phases

- **Care and Maintenance Preparations** is the first phase of decommissioning and is expected to take approximately 18 years. During this phase most of the radioactive and non-radioactive plant and buildings on the site (other than the reactor building) will be dismantled and cleared.
- **Care and Maintenance** is the second phase of decommissioning which could potentially last for some decades, during which no significant dismantling will be carried out. The site will continue to be managed, monitored and maintained.
- **Final Site Clearance** is the last phase and is expected to take about 8 years. This involves the dismantling of the remaining structures on the site, including the reactors and the clearance of any residual radioactivity to the applicable standard.

This EMP is similarly structured around these three phases; this is predominantly because mitigation measures may change in the future in light of experience and developing technologies. Where mitigation measures are still to be developed in more detail, or require changes, these will be described in subsequent issues of the EMP together with the reasons for any changes made.

The environmental impacts and mitigation measures associated with decommissioning were grouped in the Environmental Statement according to the topic area; these are all listed in Box 2. Reference to these topic areas, the associated mitigation measures and the effectiveness of any mitigations being implemented are discussed within this EMP (*see Box 2*).

Box 2: Environmental Assessment Topics

- Air Quality and Dust;
- Archaeology and Cultural Heritage;
- Ecology;
- Geology, Hydrogeology and Soils;
- Landscape and Visual;
- Noise and Vibration;
- Socio-Economic;
- Surface Waters; and
- Traffic and Transport.

In addition to the mitigation measures, a brief description of the Oldbury site and its surroundings is presented in this EMP together with an overview of the types of operations that will be carried out during Care and Maintenance Preparations (the first phase of decommissioning when most of the demolition works will take place). Further details for all phases of the decommissioning project at Oldbury are presented in the Environmental Statement. Future issues of this EMP will not only provide information on any decommissioning works that have been carried out since the previous submission, but will also contain details of decommissioning works planned for the coming year, the effectiveness of any mitigation employed to date and a review of any changes required to the mitigation measures in respect to ecological changes at the site and/or experience gained.

3. Stakeholder Engagement

Magnox Limited remains committed to engaging with stakeholders at all phases in the decommissioning process. Regular meetings have been and will continue to be held with the Site Stakeholder Group as well as other organisations (see Box 3) that will also be kept informed of activities at the site. These organisations were also involved in the public consultation process for the Environmental Statement.

As well as regular meetings with stakeholders, where appropriate, other interested parties will also be kept informed of specific decommissioning activities. Some examples are shown in Box 4.

Box 3: Local Stakeholders

- Oldbury Site Stakeholder Group;
- South Gloucestershire Council;
- Environment Agency;
- Natural England;
- Lower Severn Internal Drainage Board.

Box 4: Examples of Additional Stakeholder Activities

- Liaising with local wildlife groups regarding mitigation measures proposed for sea clover and reptiles;
- informing and liaising with Natural England, RSPB, Marine Management Organisation (MMO) and Gloucester Harbour Trustees in preparation for removal of the tidal reservoir wall; and
- informing local residents of any short-term activities that may cause a noise nuisance.

3.1. The Role of the Nuclear Decommissioning Authority (NDA)

The Energy Act (2013) requires that the NDA must prepare a strategy for carrying out its functions and from time to time to review that strategy. This strategy must set out the steps that the NDA proposes to take for:

- *“giving appropriate publicity to its responsibilities and strategy;*
- *explaining them both to persons having a particular interest in matters relating to the carrying out by the NDA of its functions and to the general public;*
- *ensuring that the NDA is kept informed at all times of the opinions about such matters of persons having such a particular interest; and*
- *facilitating the communication by such persons of their opinions to the NDA.”*

In September 2019 Magnox became a wholly owned subsidiary of the NDA. The NDA leads the decommissioning of the UK's earliest nuclear Sites and aims to do so safely, securely and cost-effectively. The NDA is also committed to achieving its goals sustainably, and is working with stakeholders to develop and improve the sustainability strategy.

The NDA is also required to give encouragement and other support to activities that benefit the social or economic life of communities living near those sites for which it has responsibilities, including Oldbury.

The NDA has given its ongoing commitment to openness and transparency and to the continued development of a proper and effective stakeholder engagement framework.

4. The Site and Surrounding Area

4.1. Site Description

Commissioned in 1967, the twin reactors and associated turbo-generators of Oldbury had a capacity of up to 460 megawatts (electrical) [MW (e)]. The site ceased generation on 29th February 2012. Since fuel free verification in 2016 the main focus for the site has been decommissioning.

The reactor building comprises two reactors of the gas-cooled magnox type³. Each reactor is enclosed in a pre-stressed, post tensioned, concrete pressure vessel lined with mild steel. Oldbury was the first nuclear power station in the UK to have such a pre-stressed concrete pressure vessel. Also contained within each pressure vessel is graphite, control equipment (including control rods and associated mechanisms), and a range of monitoring equipment (e.g. to monitor temperature and pressures). The reactors were cooled using carbon dioxide. Each reactor has four boilers which were used for heat removal and steam production which in turn drove the turbines located inside the turbine hall. Cooling of the steam to return it to water was provided by water from the River Severn which had been passed through condensing units located on the floor of the turbine hall beneath the turbines. The cooling water intake and outfall structures are located offshore and are connected to the turbine hall by means of large underground culverts.

Other buildings and plant associated with operation of the site include the cooling water pump house, the national grid substation, workshops, stores and offices.

Photograph 1: Oldbury Viewed from the Nature Trail



³ The term 'magnox' refers to the first generation of gas-cooled nuclear reactors used for electricity generation. It is derived from the cladding material (magnesium non-oxidising alloy) that surrounds each individual uranium metal fuel element.

4.2. Surrounding Landscape

The Oldbury site is located in South Gloucestershire on the eastern bank floodplain of the River Severn Estuary, close to the village of Oldbury-on-Severn and approximately 15 miles north east of the centre of the city of Bristol. The nuclear licensed site boundary encloses the operational site only, with land occupied by Oldbury Technical Centre⁴, Oldbury Conference Centre, car parking, an orchard, meadows, scrub, and woodland now delicensed. To the north and south of the site are Silt lagoons 1, 2 and 3 respectively which were previously utilised for the settlement and deposition of estuary silt dredged from the tidal reservoir and are no longer operational. To the west of the site is the River Severn and to the east open fields.

Oldbury Site is located in the Severn Shoreline Estuary Character Area, approximately 10m Above Ordnance Datum (AOD) on the edge of the Oldbury Levels, an essentially low-lying area bounded to the east by the sharply rising ground of the Severn Ridges Character Area. Within this flat, semi-open landscape, the power station often comprises a dominant element in the view.

Photograph 2: Aerial View of the Oldbury Site and Surrounding Landscape



4.3. Transport Infrastructure

The main vehicular access route to Oldbury Site from the strategic road network is from the M5 then the A38 which runs to the east of the site. When travelling to the site from the north the site is accessed via the A38 then the B4061 through Upper Morton to Butt Lane, Oldbury Lane and then onwards via Foss Lane to the site approach road. When travelling from the south access is via the A38, Grovesend Road, Morton Way, Butt Lane, Oldbury Lane and finally Foss Lane to the site approach road. There is a limited bus service to Oldbury-on-Severn village and Shepperdine, otherwise the nearest bus services are at Thornbury. There

⁴ In the Environment Statement the Oldbury Technical Centre was referred to as the Oldbury Training Centre.

is no rail access close to the site; the nearest railway stations for passenger services are at Pilning and Patchway, both stations approximately 9 miles from Oldbury but with limited services; the main line train station at Bristol Parkway approximately 11 miles from the site; or Chepstow, approximately 10 miles from Oldbury on the opposite and western side of the River Severn. Although there are provisions made for cyclists on the Site, there are no specific facilities for cyclists and pedestrians connecting the Site to any of the local villages or Thornbury town. In general, the number of staff walking or cycling to work is low.

4.4. Local Watercourses

The main surface water feature in the area is the River Severn. The estuary and the coastal floodplain is a dynamic environment that is constantly evolving by natural processes, including sediment deposition and erosion, and by human influences such as the reclamation of land. The dynamic nature of the estuary is partly due to its large tidal range – reaching in excess of 14.5 m at Avonmouth at spring tide. The River Severn Estuary has the second largest tidal range in the world. This means that large volumes of water enter the estuary, often at high speed, and rapidly change the estuary's physical character through erosion, deposition and sediment transport. Some reaches of the estuary are eroding rapidly as a consequence. However, this is not the case along the section of coastline occupied by Oldbury.

4.5. Geology and Hydrogeology

The Oldbury area is directly underlain by Estuarine Alluvium overlying the Triassic Mercia Mudstone Group (formerly known as the Keuper Marl). The upper part of the Mercia Mudstone extending beneath the water table is weathered and is characteristically comprised of lithorelicts of weak and very weak siltstone and sandstone in a red-brown clayey silt matrix. The Alluvium comprises a soft to stiff blue-grey clay, sandy in places with occasional gravel and peat layers (the latter in the northern part of the site). The mean thickness of the alluvium is some 4.0m, with site wide thickness ranging from 1.0m to 8.0m. In many of the post construction boreholes the Alluvium is shown to be overlain by fill consisting of reworked mudstone with gravel and cobbles in places. The base of Mercia Mudstone overlies the Dolomitic Conglomerate which without conforming overlies the Thornbury beds of the Devonian Lower Old Red Sandstone. These comprise red-brown sandy mudstones with subordinate sandstones.

The Oldbury area is underlain by 'seasonally wet deep clay' soils. Superficial geology is indicated to be Alluvium, comprising clay, silt, sand and gravel. These soils are considered likely to have low, although slightly variable permeability that is ultimately dependent upon the relative proportions of clay, sand and gravel.

The region surrounding the Oldbury site is classified by the Environment Agency as 'Indicative Tidal Floodplain'. The Alluvial deposits and Mercia Mudstone Group beneath this area of estuarine floodplain is regarded by the EA as a 'non-aquifer'.

4.6. Sensitivity of the Receiving Environment

The nearest settlements to the site are the villages of Shepperdine, about ½ mile to the north-east, Oldbury-on-Severn and Oldbury Naite both approximately ¾ mile to the south

and south-east respectively, and the towns of Thornbury, 3 miles to the south east and Chepstow 5 miles to the west. The city of Bristol is located approximately 6 miles to the south of the site.

The area around the site is adjacent to the River Severn and contains an intertidal zone of mudflats, sandbanks, rocky platforms, saltmarsh and grazing marsh. The estuary forms one of the most important inter-tidal zones in Britain, providing internationally important feeding grounds for over-wintering and migratory waders and wildfowl. The estuary also attracts large populations of important migratory fish species. The area is of international, national and local conservation importance with the following conservation designations:

- Severn Estuary Site of Special Scientific Interest (SSSI)⁵;
- Severn Estuary Wetland of International Importance under the Ramsar Convention⁶;
- Severn Estuary Special Protection Area (SPA)⁷; and
- Severn Estuary Special Area of Conservation (SAC)⁸.

The estuarine extent of the above designations is to the top of the riverbank (i.e. up to the coastal footpath) hence only the Oldbury cooling water intake jetty is included within the designations.

There are no Scheduled Ancient Monuments on the power station site. The nearest is Oldbury Camp, an iron-age fort at Oldbury-on-Severn approximately 1.5km to the south of the site. There are also no Listed Buildings on the Oldbury site. However there are a number of Grade II Listed Buildings within the village of Oldbury-on-Severn. There are no parks or gardens of historic interest on or adjacent to the site. There are no registered historic battlefields on or adjacent to the power station, the nearest is at Whitcliff Park approximately 5km to the north east of the site.

⁵ Under the Wildlife and Countryside Act 1981, the Joint Nature Conservation Committee (JNCC) has a duty to notify areas of land which it considers to be 'of special interest by reason of any of its flora, fauna or geological or physical features'.

⁶ Designated under the Ramsar Convention on Wetlands of International Importance especially as a waterfowl habitat.

⁷ Areas which support certain endangered, rare or vulnerable species (found in Annex 1 of the Directive) or regularly occurring migratory birds of European importance can be designated as SPAs under The European Communities Council Directive on the Conservation of Wild Birds (79/409/EEC), commonly referred to as the birds directive.

⁸ Areas containing rare or vulnerable habitats or species which are of EU interest can be designated as SACs under the European Communities Council Directive on the Conservation of natural habitats and of wild fauna and flora (92/43/EEC, amended by Directive 97/62/EC). The Severn Estuary Candidate SAC had its status approved as a SAC by the UK government from the 10th December 2009.

5. Mitigation Measures

It is a requirement of the conditions attached to the consent (Appendix A), to implement the mitigation measures and describe their effectiveness over time. This chapter discusses the processes in place at Oldbury to do this. Tables 1, 2 and 3 list the mitigation measures for each phase of the decommissioning project at Oldbury.

There are no changes to the mitigation measures that were submitted in the Environmental Statement and reported in previous submissions of the Environmental Management Plan.

5.1 Implementation of Mitigation Measures

There are a number of processes at Oldbury which ensure that the identified mitigation measures are implemented when required. All decommissioning projects and modifications to plant are assessed during the project proposal stage in accordance with robust company management control procedures. A decommissioning project approval form is used to assess whether there may be any changes to the baseline and determine whether further environmental assessment and mitigation is required. An Environmental Risk Assessment process has been implemented (Appendix B) and is applied to all work on site where there is a potential for an environmental impact. The Environmental Risk Assessment ensures that appropriate mitigations measures are implemented. This risk assessment is subject to approval and sign off by the site environmental qualified person.

In addition, there are a number of other tools to ensure that all environmental impacts are minimised. The site ensures compliance with BS EN ISO 14001:2015 by following the Company Procedure for environmental management which is itself embedded into the Integrated Management System (IMS) for Magnox Limited.

Oldbury also undertakes Best Available Techniques (BAT) studies for those projects where it is deemed that there is a potential for significant radioactive and non-radioactive discharges and disposals from the site and where it is required to demonstrate that these impacts are minimised through evaluation by a clear, systematic and transparent process.

Alongside this EMP, Oldbury has a Biodiversity Action Plan (BAP). The BAP is a separate document which describes measures to maintain and enhance the biodiversity of the site in accordance with the local and national BAPs (LBAP and UKBAP). Oldbury's BAP aims to complement those mitigation measures as described in the Environmental Statement and EMP. Advice and assistance from local wildlife groups are to be sought to assist in updating and implementing the BAP.

The latest 2021 & 2022 Oldbury BAP (issue 8) was issued in March of 2021. Information on this and previous BAP's can be obtained from Oldbury Environment Team.

5.2 Demonstrating the Effectiveness of Mitigation Measures

The site aims to continually monitor the effectiveness of the specified mitigation measures over time, and where necessary review, in order to ensure the success of reducing significant environmental impacts. Interaction between the project and environment team from the conceptual stage through to completion of the project allows for the identification and planning of any required mitigations. It also enables appropriate supervision and practical

evaluation of the effectiveness of the mitigation measures implemented. Evaluations can provide valuable feedback on any difficulties encountered, changes required or highlight further mitigation requirements.

The site aims to measure the effectiveness of mitigations in a number of ways, these are outlined below;

1) Environmental Performance Monitoring and Surveys

Environmental performance monitoring such as dust, noise and groundwater monitoring and ecological surveys can provide both baseline and post-mitigation assessment. Post-mitigation environmental monitoring will be used to measure the effectiveness of mitigation measures for larger projects on site such as building demolition and projects involving large numbers of HGV movements. The requirement of this method of measuring effectiveness is determined on an individual project basis as appropriate.

2) Visual Evidence

Site photographs can be taken before the start of a project to provide a good visual indication of the surrounding area and help to identify potential environmental receptors in the vicinity (e.g. surface drains) and highlight the mitigations that may be required.

Visual inspections and photographs during and after the work can also provide an indication of effectiveness of a mitigation measure. For example, presence of mud on roads can be an indication of insufficient wheel washing of HGV's.

3) Review of Regulatory Action, Complaints and Internal Event Reporting

Review of regulatory actions, complaints and internal event reporting is a form of reactive monitoring which can provide valuable information about where mitigations may not be effective or where further mitigations are required. The site operates a robust system of internal event reporting, where workers report conditions which are unsafe, or potentially pose a threat to safety or the environment. These reports will be investigated and rectified as appropriate. This reporting system also includes a formal process to manage any external complaints and together they could indicate effectiveness of mitigation measures. For example, complaints from members of the public on noise related activities on site can be an indication that additional silencers on equipment may be required or internal reporting on sediments entering surface water drains, may be an indication of ineffective seeding of soil stockpiles on site.

Although a 'clean sheet' may not necessarily mean mitigation measures are completely effective, it can indicate over a period of time that a significant environmental impact is effectively being mitigated.

5.3 Care and Maintenance Preparations

Mitigation measures already identified (Condition 3a)

Environmental Impact	Mitigation Measure	Action	Comments
Air Quality and Dust			
<p>Dust Emissions (from on-site)</p> <ul style="list-style-type: none"> Increase in site dust emissions due to construction, demolition and waste / materials handling operations etc. which could impact on residential and industrial receptors. 	<p>The following best practice measures will be implemented as appropriate:</p> <ul style="list-style-type: none"> On-site roads to be regularly cleaned of mud/dust deposits, including the use of re-circulating water wheel washers and road cleaners as appropriate; and sheeting of vehicles carrying potentially dusty loads; Minimisation of unnecessary material and waste handling as far as practicable; Use of water sprays for external demolition activities as appropriate; Use of water sprays during outside in-fill operations; Avoidance of vehicular use of un-surfaced (soft) ground where possible and limits on vehicle speeds on such surfaces where it cannot be avoided; Use of water sprays during particularly windy or dry conditions; Use of water sprays to maintain damp surfaces during dry and windy weather (e.g. soil stockpiles, demolition rubble); or sheeting or seeding of surfaces of stockpiles of soil or other dusty materials; Sheeting or seeding of surfaces and/or use of wind fences; and Covering of containers and/or use of wind fences. 	<ul style="list-style-type: none"> Routine control will be enforced through existing site procedures. Any additional requirements will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. The effectiveness of dust mitigation will be monitored. There are a variety of means of measuring dust deposition (e.g. sticky pads); directional monitoring will be used if possible. It may be appropriate to initiate monitoring before works commence in order to determine the background contribution to which the site may add. Arrangements will be discussed and agreed in advance with the local authority as necessary. 	<ul style="list-style-type: none"> These mitigation measures primarily concern impacts on humans. However, their implementation will also offset possible impacts of dust deposition on sensitive habitats immediately adjacent to the site. Sensitive habitats include the foreshore habitat.
<p>Dust Emissions (road side from vehicles)</p> <p>Increase in dust at residential properties along traffic routes due to soiled vehicles or vehicles carrying dust loads.</p>	<p>As appropriate:</p> <ul style="list-style-type: none"> Sheeting of lorries carrying dusty loads; and Provision of wheel and body washing where appropriate for, as a minimum, heavy goods vehicle leaving the site. 	<ul style="list-style-type: none"> Routine control will be enforced through existing site procedures. Any additional requirements will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. These mitigation measures will be considered as part of the development of the Transport Management Plan. 	<p>These mitigation measures primarily concern impacts on humans and aim to reduce the potential for complaints associated with fugitive dust.</p>

Environmental Impact	Mitigation Measure	Action	Comments
Archaeology and Cultural Heritage			
No significant adverse environmental impacts identified arising from decommissioning activities			
Ecology			
Badgers <ul style="list-style-type: none"> Loss of foraging habitat and potential loss of setts 	No works within 30m of a badger sett without licence from Natural England. <ul style="list-style-type: none"> Provision of up to 5m width foraging zones alongside retained hedgerows and trees around those meadows to be developed for the benefit of foraging badgers. 	<ul style="list-style-type: none"> Head of Environment to ensure that measures are put in place sufficiently in advance of the works and, if required, to ensure that a qualified and experienced ecologist is used in the process of obtaining a badger licence. These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	
Great Crested Newts/Reptiles <ul style="list-style-type: none"> Incidental Mortality 	<ul style="list-style-type: none"> Under licence from Natural England, fence off and clear amphibians from areas having been identified as offering suitable foraging habitat and only as and when the areas are planned to be used for materials storage and car parking: i.e. meadows 1, 2, and 3 (see Figure OLD/EC/03 of the Environmental Statement). 	<ul style="list-style-type: none"> This mitigation measure will only be implemented when an area that has been identified as suitable foraging habitat for amphibians, is planned to be used. An experienced ecologist will be employed to oversee this work and to obtain a licence from Natural England. Head of Environment to ensure that measures are put in place sufficiently in advance of works and that the advice of a suitably qualified and experienced person is first obtained. 	
Peregrine <ul style="list-style-type: none"> Disturbance 	<ul style="list-style-type: none"> Buildings to be checked for nesting peregrine prior to demolition to ensure compliance with the Wildlife and Countryside Act. 	<ul style="list-style-type: none"> Head of Environment to ensure that periodic visual inspections are carried out for active nest sites using a suitably qualified ecologist. 	Although the impact has been assessed as 'not significant', peregrines receive some protection under the Wildlife and Countryside Act 1981, mitigation is therefore required.
Sea Clover <ul style="list-style-type: none"> Loss of habitat 	<ul style="list-style-type: none"> Sea clover seeds to be collected in July from individual plants within development area and scattered in vegetation gaps within the foraging zones identified as mitigation for the loss of foraging habitat for badgers. Restoration of the developed areas to take place at end of Care and Maintenance Preparations phase using a similar mix of species ideally including sea clover seed, cuttings or transplants. 	<ul style="list-style-type: none"> Head of Environment to ensure that measures are put in place sufficiently in advance of works and that the advice of a suitably qualified and experienced person is first obtained. 	
Semi-Improved Grassland <ul style="list-style-type: none"> Loss of habitat 	<ul style="list-style-type: none"> If used for decommissioning, meadows 1,2, and 3 (see Figure OLD/EC/03 of the Environmental Statement) to be re-sown with a species-mix matching the plant communities currently found and ideally containing sea clover seed or transplants. 	<ul style="list-style-type: none"> This measure will be implemented as part of the decommissioning project plan. 	Although the impact has been assessed as 'not significant' the meadows will be re-sown as good environmental practice and to encourage biodiversity.

Environmental Impact	Mitigation Measure	Action	Comments
<p>Severn Estuary SPA/SAC/SSSI/Ramsar</p> <ul style="list-style-type: none"> • Dust deposition on coastal saltmarsh • Loss of feeding habitat for birds during removal of tidal reservoir wall; and • Disturbance of fish due to noise and vibration during removal of the tidal reservoir wall 	<ul style="list-style-type: none"> • Undertake removal of tidal reservoir wall at low tide only and outside of peak period when significant numbers of SPA birds may be present (December to February). • Use of water sprays for external demolition activities as appropriate; 	<ul style="list-style-type: none"> • These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. • Decommissioning Team to seek assistance from the Environment Team. 	
Geology, Hydrogeology and Soils			
<ul style="list-style-type: none"> • Inadvertent or uncontrolled disturbance or spreading of existing contaminated soils, including movement by windblown dust, entrainment in runoff, attachment to vehicles and/or inappropriate soil handling operations. 	<ul style="list-style-type: none"> • Desk studies and site investigation, if necessary, before works commence in order to determine the presence or absence of contamination, so that appropriate working practices can be adopted from the outset. • Controlled access to or from known or potentially contaminated working areas as appropriate. • Use of re-circulating wheel washers on HGVs leaving site as appropriate. • Compliance with Pollution Prevention Guidance (PPG) e.g. PPG2, 6, 11 and 21, as appropriate. • See also dust control measures. • See also measures under ‘Inadvertent contamination of soils and/or groundwater arising from temporary storage of contaminated soils, wastes or materials.’ 	<ul style="list-style-type: none"> • These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	<ul style="list-style-type: none"> • Wheel washing addresses dust, ecology, surface waters and highways impacts also.
<ul style="list-style-type: none"> • Mobilisation of existing contamination by direct rainwater infiltration due to changes in ground cover or the creation of open excavations. 	<ul style="list-style-type: none"> • Investigation of contaminated soils prior to the removal of hard-standings or buildings/foundations with prior remediation if necessary. • Excavation dewatering, if necessary, with monitoring and appropriate management/disposal of any waters arising. • Tenting of exposed areas or excavations, if necessary. • Compliance with relevant PPGs including 11 and 21. 	<ul style="list-style-type: none"> • These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	<ul style="list-style-type: none"> • Although the impact has been assessed as ‘not significant’ these mitigation measures are proposed because they constitute good practice.
<ul style="list-style-type: none"> • Mobilisation of existing contamination due to changes in water table levels and consequential changes to the groundwater flow regime (e.g. due to changes in ground covering and rainwater infiltration). 	<ul style="list-style-type: none"> • Desk studies and site investigation, if necessary, to determine groundwater levels, flows and characterise the full extent of any contamination (both in the saturated and unsaturated zones). • Dewatering of affected areas, if necessary, to avoid mobilisation of contaminants. Remediation may be required if contamination is significant. • Better constrain current baseline conditions for groundwater quality to provide suitable comparison to any future changes. 	<ul style="list-style-type: none"> • These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	

Environmental Impact	Mitigation Measure	Action	Comments
<ul style="list-style-type: none"> Creation of new contaminant migration pathways (e.g. due to the creation of boreholes, piles or excavations connecting previously unconnected geological strata). 	<ul style="list-style-type: none"> Compliance with British Standard 5930 (Code of Practice for Site Investigations) and BS 10175 (Investigation of Potentially Contaminated Sites – Code of Practice). Compliance with EA Technical Report P5-065/TR (Technical Aspects of Site Investigation). Production of risk assessments, method statements and contingency plans. Compliance with relevant PPG guidelines. Production of risk assessments, method statements and contingency plans. Use of made ground that does not exceed average permeability of in-situ material to cause groundwater flow issues. Placement of flow barriers and monitoring of level and flow pattern impacts, as required. 	<ul style="list-style-type: none"> Routine control will be enforced through existing site procedures. Any additional requirements will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	
<ul style="list-style-type: none"> Inadvertent contamination of soils and/or groundwater arising from temporary storage of contaminated soils, wastes or materials. 	<ul style="list-style-type: none"> Sampling and testing of soils, wastes and materials prior to storage as appropriate. Segregation as appropriate. Use of containment (e.g. membranes) to eliminate cross-contamination, as appropriate. Management of rainwater run-off from storage areas for contaminated or potentially contaminated soil, wastes and materials. 	<ul style="list-style-type: none"> Routine control will be enforced through existing site procedures. Any additional requirements will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	
<ul style="list-style-type: none"> Inadvertent contamination of soils and/or groundwater arising from inappropriate use of contaminated soils, wastes or materials as in-fill materials. 	<ul style="list-style-type: none"> Sampling and testing of potentially contaminated soils, wastes and materials prior to use as appropriate. Authorised disposal of unsuitable soils, wastes and materials. 	<ul style="list-style-type: none"> Routine control will be enforced through existing site procedures. Any additional requirements will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	
<ul style="list-style-type: none"> Inadvertent effects on groundwater flow and quality due to infill of deep basements and the breaching of basement structures to prevent ponding. 	<ul style="list-style-type: none"> Improved characterisation of groundwater levels and flow direction prior to the start of decommissioning. Sampling and testing of potentially contaminated soils, wastes and materials prior to use as appropriate. Puncture all remaining services and foundations to reduce the likelihood of ponding. 	<ul style="list-style-type: none"> These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	
<ul style="list-style-type: none"> Changes in soil and groundwater quality due to spills or leaks of non-radioactive substances. 	<ul style="list-style-type: none"> Bunding of chemical and fuel storage according to EA Pollution Prevention Guidance (PPG) Notes 2 and 6. Appropriate protocols for chemicals and fuel handling in line with PPG6 and PPG11, with trained staff only to operate facilities. Emergency spill response planning according to PPG21, including spill kits kept on site and trained staff available. 	<ul style="list-style-type: none"> Routine control will be enforced through existing site procedures. Any additional requirements will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning plans. 	

Environmental Impact	Mitigation Measure	Action	Comments
Landscape and Visual			
<ul style="list-style-type: none"> Light spill 	<ul style="list-style-type: none"> Any new lighting to be installed on site should be directional lighting. 	<ul style="list-style-type: none"> This mitigation will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	<ul style="list-style-type: none"> The impact associated with any additional lighting on site has been assessed as 'not significant'. However, this mitigation measure is proposed as a measure of best practice, in order to contain the extent of illumination to those areas which are intended to be lit only.
<ul style="list-style-type: none"> Trees 	<ul style="list-style-type: none"> Careful siting and use of protective fencing where necessary compliant with BS 5837:2005, Trees in Relation to Construction. 	<ul style="list-style-type: none"> This mitigation will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	<ul style="list-style-type: none"> The impact associated with the construction of car parking or working areas has been assessed as 'not significant'. However, this mitigation measure is proposed as a measure of best practice in order to protect existing trees. Any damaged trees to be re-planted at the end of Care and Maintenance Preparations.
Noise and Vibration			
<p>Local residential properties, recreational areas & industrial receptors</p> <ul style="list-style-type: none"> General changes to noise directly from the site and associated changes in traffic. 	<p>As appropriate:</p> <ul style="list-style-type: none"> Use of equipment fitted with effective silencers where practicable; Appointment of a site contact to whom complaints/queries about construction/demolition activity can be directed - any complaints to be investigated and action taken where appropriate; Local residents informed of exceptional activities; No potentially significant external working outside of normal working hours without prior agreement with the local authority; and All construction activity to be undertaken in accordance with good practice as described by British Standard 5228:1997 Noise and Vibration Control on Construction and Open Sites. This includes minimising unnecessary revving of engines, turning off machines when not required and routine maintenance of equipment. 	<ul style="list-style-type: none"> These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	<p>The use of noise barriers between particularly noisy activities and sensitive receptors may be appropriate but is not currently proposed. Upon completion of the detailed methodology of work, an agreement with the local authority under Section 61 of the Control of Pollution Act 1974 may be appropriate.</p>

Environmental Impact	Mitigation Measure	Action	Comments
Socio-economic			
Direct Employment <ul style="list-style-type: none"> Long-term loss of jobs 	<ul style="list-style-type: none"> Magnox Limited will encourage its contractors to make use of local labour, equipment & services as far as practicable. Magnox Limited will attempt to re-deploy affected staff & support staff in re-training/re-skilling for decommissioning roles. 	<ul style="list-style-type: none"> Contractors will be provided with a list of local companies known to be capable of involvement as sub-contractors in decommissioning works. 	
Surface Waters			
<ul style="list-style-type: none"> The potential release of turbid and/or contaminated water from decommissioning activities on the site. 	<p>Where necessary:</p> <ul style="list-style-type: none"> Wetting down (e.g. excavation or construction/demolition areas) to prevent windblown spread of dust into locations where subsequent washing into surface water drains would be likely, and appropriate management of wastewater arising. On-site roads to be regularly kept free from mud/dust deposits, including the use of re-circulating water wheel washers and road cleaners as appropriate. Sheeting or seeding of any long term stockpiles of soil to reduce wash-off of suspended solids. Careful design and siting of spoil mounds as necessary to manage run-off, including use of low walls around such mounds if appropriate. See also measures under geology, hydrogeology and soils in relation to turbid and/or contaminated water entering the storm drainage system. 	<ul style="list-style-type: none"> These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	<ul style="list-style-type: none"> Wheel washing addresses dust, ecology, geology etc. and highways impacts also.
<ul style="list-style-type: none"> Potential minor spills and leaks of non-radioactive substances. 	<ul style="list-style-type: none"> Careful siting of concrete plant and fuel/chemical handling facilities according to EA Pollution Prevention Guidance (PPG) Notes 5 and 6. Bunding of chemical and fuel storage according to PPG2, PPG5 and PPG6. Oil separation facilities on the surface water drainage system at appropriate locations. Appropriate protocols for chemicals and fuel handling in line with EA PPG6 and PPG11, with trained staff only to operate facilities. Emergency/spill response planning according to PPG21; including spill kits kept on site and trained staff available at all times. 	<ul style="list-style-type: none"> Routine control will be enforced through existing site procedures. Any additional requirements will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	

Environmental Impact	Mitigation Measure	Action	Comments
Traffic and Transport			
<ul style="list-style-type: none"> Impacts on safety on roads (Fosse Lane, Hill Lane, The Naite.) 	<ul style="list-style-type: none"> No specific mitigation is possible because of the absence of specific accident clusters and causes and/or because the routes benefit from accident records at or below the national average. However, a Travel Plan will be implemented which will encourage communal transport or car sharing (see Appendix C). 	<ul style="list-style-type: none"> Development of a Transport Management Plan to encourage communal transport or car sharing. 	
<ul style="list-style-type: none"> Environmental Impacts e.g. proximity of vehicles to pedestrians, pedestrian amenity and mud on roads etc. 	<ul style="list-style-type: none"> No specific mitigation is possible because of the absence of specific accident clusters and causes. However, a Travel Plan will be implemented which will encourage communal transport or car sharing (see Appendix C). Wheel washing of HGVs as necessary. 	<ul style="list-style-type: none"> These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. The mitigation measures will be considered as part of the development of the Transport Management Plan 	<ul style="list-style-type: none"> Wheel washing addresses dust, ecology, geology etc. and surface waters impacts also.

Activities where mitigation may be required but specific measures cannot yet be selected (Condition 3b)

Environmental Impact	Mitigation Measures Under Consideration
No such activities have been identified.	

Activities where mitigation may be required but it is not yet possible to identify possible mitigation measures (Condition 3c)

Environmental Impact
No such activities have been identified.

5.4 Care and Maintenance

Environmental Impact	Mitigation Measure	Action	Comments
Geology, Hydrogeology and Soils			
<p>Several tasks carried out during Care and Maintenance Preparations may give rise to on-going impacts for the subsequent decommissioning phase. In respect of these on-going impacts then some or all of the impacts and mitigation measures (all of which would have been applied in the preceding phase) are as described above under Geology, Hydrogeology and Soils for the Care and Maintenance Preparations phase. The impacts and mitigation measures associated with any maintenance to be carried out during the Care and Maintenance phase would be encompassed by those discussed for Care and Maintenance Preparations.</p>			
<p>There are no other significant adverse environmental impacts so far identified as arising from decommissioning activities during this phase.</p>			

5.5 Final Site Clearance

Mitigation measures already identified (Condition 3a)

Environmental Impact	Mitigation Measure	Action	Comments
Air Quality and Dust			
Dust Emissions (from on-site) <ul style="list-style-type: none"> Increase in site dust emissions due to construction, demolition and waste / materials handling operations etc. which could impact on residential and industrial receptors. 	<p>The following best practice measures will be implemented as appropriate:</p> <ul style="list-style-type: none"> On-site roads to be regularly cleaned of mud/dust deposits, including the use of re-circulating water wheel washers and road cleaners as appropriate; and sheeting of vehicles carrying potentially dusty loads; Minimisation of unnecessary material and waste handling as far as practicable; Use of water sprays for external demolition activities as appropriate; Use of water sprays during outside in-fill operations; Avoidance of vehicular use of un-surfaced (soft) ground where possible and limits on vehicle speeds on such surfaces where it cannot be avoided; Use of water sprays during particularly windy or dry conditions; Use of water sprays to maintain damp surfaces during dry and windy weather (e.g. soil stockpiles, demolition rubble); or sheeting or seeding of surfaces of stockpiles of soil or other dusty materials; Sheeting or seeding of surfaces and/or use of wind fences; and Covering of containers and/or use of wind fences. 	<ul style="list-style-type: none"> Routine control will be enforced through existing site procedures. Any additional requirements will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. The effectiveness of dust mitigation will be monitored. There are a variety of means of measuring dust deposition (e.g. sticky pads); directional monitoring will be used if possible. It may be appropriate to initiate monitoring before works commence in order to determine the background contribution to which the site may add. Arrangements will be discussed and agreed in advance with the local authority. 	<ul style="list-style-type: none"> These mitigation measures primarily concern impacts on humans. However, their implementation will also offset possible impacts of dust deposition on sensitive habitats immediately adjacent to the site. Sensitive habitats include the foreshore habitat.
Dust Emissions (road side from vehicles) <ul style="list-style-type: none"> Increase in dust at residential properties along traffic routes due to soiled vehicles or vehicles carrying dust loads. 	<p>As appropriate:</p> <ul style="list-style-type: none"> Sheeting of lorries carrying dusty loads; and Provision of wheel and body washing where appropriate for, as a minimum, heavy goods vehicle leaving the site. 	<ul style="list-style-type: none"> Routine control will be enforced through existing site procedures. Any additional requirements will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. These mitigation measures will be considered as part of the development of the Transport Management Plan. 	<ul style="list-style-type: none"> These mitigation measures primarily concern impacts on humans and aim to reduce the potential for complaints associated with fugitive dust.
Archaeology and Cultural Heritage			

Environmental Impact	Mitigation Measure	Action	Comments
No significant adverse environmental impacts identified arising from decommissioning activities			
Ecology			
Impacts and mitigation measures associated with this phase are expected to be very similar to those identified for the Care and Maintenance Preparations phase except for the removal of offshore structures including removal of the tidal reservoir wall. The mitigation measures proposed for the C&M Preps phase are therefore repeated here for completeness however, prior to any works commencing a number of ecological surveys will be undertaken to determine the presence or absence of protected species and habitats or species of conservation concern, both within and immediately adjacent to the site and up to an agreed distance from the site boundary. Proposed mitigation measures will be reviewed and revised as appropriate at the time in light of the results of the new surveys and nature conservation policies at that time.			
Badgers <ul style="list-style-type: none"> Loss of foraging habitat and potential loss of setts 	<ul style="list-style-type: none"> No works within 30m of a badger sett without licence from Natural England; Provision of up to 5m width foraging zones alongside retained hedgerows and trees around any meadows to be developed for the benefit of foraging badgers. 	<ul style="list-style-type: none"> Head of Environment to ensure that measures are put in place sufficiently in advance of the works and, if required, to ensure that a qualified and experienced ecologist is used in the process of obtaining a badger licence. These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	
Great Crested Newts/Reptiles <ul style="list-style-type: none"> Incidental Mortality 	<ul style="list-style-type: none"> Reptile proof fencing to be used to prevent reptiles from moving into working areas. Under licence from Natural England, fence off and clear amphibians from areas. Reptile proof fencing should be installed prior to works commencing, allowing a period of time for reptiles to move out of a work area identified as offering suitable foraging habitat. 	<ul style="list-style-type: none"> This mitigation measure will only be implemented when an area that has been identified as suitable foraging habitat for amphibians /reptiles is planned to be used. An experienced ecologist will be employed to oversee this work and to obtain a licence from Natural England. Environmental Engineer to ensure that measures are put in place sufficiently in advance of works and that the advice of a suitably qualified and experienced person is first obtained. 	
Peregrine <ul style="list-style-type: none"> Disturbance 	<ul style="list-style-type: none"> Buildings to be checked for nesting peregrine prior to works being carried out to ensure compliance with the Wildlife and Countryside Act. 	<ul style="list-style-type: none"> Head of Environment to ensure that periodic visual inspections are carried out for active nest sites using a suitably qualified ecologist. 	<ul style="list-style-type: none"> Although the impact has been assessed as 'not significant', peregrines receive some protection under the Wildlife and Countryside Act 1981, mitigation is therefore required.
Sea Clover <ul style="list-style-type: none"> Loss of habitat 	<ul style="list-style-type: none"> Sea clover seeds to be collected in July from individual plants within development area and scattered in vegetation gaps within the foraging zones identified as mitigation for the loss of foraging habitat for badgers. Restoration of developed areas to take place at end of the decommissioning phase using a similar mix of species ideally including sea clover seed, cuttings or transplants. 	<ul style="list-style-type: none"> Head of Environment to ensure that measures are put in place sufficiently in advance of works and that the advice of a suitably qualified and experienced person is first obtained. 	

Environmental Impact	Mitigation Measure	Action	Comments
Semi-Improved Grassland <ul style="list-style-type: none"> Loss of habitat 	<ul style="list-style-type: none"> If used for decommissioning, meadows 1,2, and 3 (see Figure OLD/EC/03 of the Environmental Statement) to be re-sown with a species-mix matching the plant communities currently found and ideally containing sea clover seed or transplants. 	<ul style="list-style-type: none"> This measure will be implemented as part of the decommissioning project plan. 	<p>Although the impact has been assessed as 'not significant' the meadows will be re-sown as good environmental practice and to encourage biodiversity.</p>
Severn Estuary SPA/SAC/SSSI/Ramsar <ul style="list-style-type: none"> Dust deposition on coastal saltmarsh 	<ul style="list-style-type: none"> Use of water sprays for external demolition activities as appropriate; 	<ul style="list-style-type: none"> This mitigation measure will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	
Geology, Hydrogeology and Soils			
<ul style="list-style-type: none"> Inadvertent or uncontrolled disturbance or spreading of existing contaminated soils, including movement by windblown dust, entrainment in runoff, attachment to vehicles and/or inappropriate soil handling operations. 	<ul style="list-style-type: none"> Desk studies and site investigation, if necessary, to determine the presence or absence of contamination, so that appropriate working practices can be adopted from the outset; Controlled access to or from known or potentially contaminated working areas as appropriate; Compliance with relevant PPGs (2, 6, 11 and 21) as appropriate. Use of re-circulating wheel washers on HGVs leaving site as appropriate. See also measures under 'Inadvertent contamination of soils and/or groundwater arising from temporary storage of contaminated soils, wastes or materials.' See also dust control measures. 	<ul style="list-style-type: none"> These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	<ul style="list-style-type: none"> Wheel washing addresses dust, ecology, surface waters and highways impacts also.
<ul style="list-style-type: none"> Mobilisation of existing contamination by direct rainwater infiltration due to changes in ground cover or the creation of temporary open excavations 	<ul style="list-style-type: none"> Investigation of contaminated soils prior to removal of hard-standings or buildings/foundations (possibly by desk study alone if appropriate), with prior remediation if necessary. Excavation dewatering, if necessary, with monitoring and appropriate management/disposal of any waters arising. Tenting of exposed areas or excavations, if necessary. Compliance with relevant PPGs including PPG11 and 21. 	<ul style="list-style-type: none"> These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	<ul style="list-style-type: none"> Although the impact has been assessed as 'not significant' these mitigation measures are proposed because they constitute good practice.
<ul style="list-style-type: none"> Mobilisation of existing contamination by direct rainwater infiltration due to the creation of temporary open excavations. 	<ul style="list-style-type: none"> Desk studies and site investigation, if necessary, to determine groundwater levels, flows and characterise the full extent of any contamination (both in the saturated and unsaturated zones). Dewatering of affected areas to avoid mobilisation of contaminants. Better constrain current baseline conditions for groundwater quality to provide suitable comparison to any future changes. 	<ul style="list-style-type: none"> These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	

Environmental Impact	Mitigation Measure	Action	Comments
<ul style="list-style-type: none"> Creation of new contaminant migration pathways (e.g. due to the creation of boreholes, piles or excavations and/or placement of permeable made ground connecting previously unconnected geological strata). 	<ul style="list-style-type: none"> Compliance with British Standard 5930 (Code of Practice for Site Investigations) and BS 10175 (Investigation of Potentially Contaminated Sites – Code of Practice). Compliance with EA Technical Report P5-065/TR (Technical Aspects of Site Investigation). Production of risk assessments, method statements and contingency plans. Compliance with PPG guidelines. Use of made ground that does not exceed average permeability of in-situ material to cause groundwater flow issues. Placement of flow barriers and monitoring level and flow pattern impacts, as required. 	<ul style="list-style-type: none"> Routine control will be enforced through existing site procedures. Any additional requirements will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	
<ul style="list-style-type: none"> Inadvertent contamination of soils and/or groundwater arising from temporary storage of contaminated soils, wastes or materials. 	<ul style="list-style-type: none"> Sampling and testing of soils, wastes and materials prior to storage as appropriate. Segregation as appropriate. Use of containment (e.g. membranes) to eliminate cross-contamination, as appropriate. Management of rainwater run-off from storage areas for contaminated or potentially contaminated soil, wastes and materials. 	<ul style="list-style-type: none"> Routine control will be enforced through existing site procedures. Any additional requirements will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	
<ul style="list-style-type: none"> Inadvertent contamination of soils and/or groundwater arising from inappropriate use of contaminated soils, wastes or materials as in-fill materials. 	<ul style="list-style-type: none"> Sampling and testing of potentially contaminated soils, wastes and materials prior to use as appropriate. Authorised disposal of unsuitable soils, wastes and materials. 	<ul style="list-style-type: none"> Routine control will be enforced through existing site procedures. Any additional requirements will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	
<ul style="list-style-type: none"> Inadvertent effects on groundwater flow and quality due to infill of deep basements and the breaching of basement structures to prevent ponding. 	<ul style="list-style-type: none"> Improved characterisation of groundwater levels and flow direction prior to the start of decommissioning. Sampling and testing of potentially contaminated soils, wastes and materials prior to use as appropriate. Puncture all remaining services and foundations to reduce the likelihood of ponding. 	<ul style="list-style-type: none"> These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	
<ul style="list-style-type: none"> Changes in soil and groundwater quality due to spills or leaks of non-radioactive substances. 	<ul style="list-style-type: none"> Bundling of chemical and fuel storage according to PPG Notes 2 and 6. Appropriate protocols for chemicals and fuel handling in line with PPG6 and PPG11, with trained staff only to operate facilities. Emergency spill response planning according to PPG21, including spill kits kept on site and trained staff available. 	<ul style="list-style-type: none"> Routine control will be enforced through existing site procedures. Any additional requirements will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning plans. 	

Environmental Impact	Mitigation Measure	Action	Comments
Landscape and Visual			
<ul style="list-style-type: none"> Light spill 	<ul style="list-style-type: none"> Any new lighting to be installed on site should be directional lighting. 	<ul style="list-style-type: none"> These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	<ul style="list-style-type: none"> The impact associated with any additional lighting on site has been assessed as 'not significant'. However, this mitigation measure is proposed as a measure of best practice, in order to contain the extent of illumination to those areas which are intended to be lit only.
<ul style="list-style-type: none"> Trees 	<ul style="list-style-type: none"> Careful siting and use of protective fencing where necessary compliant with BS 5837:2005, Trees in Relation to Construction. 	<ul style="list-style-type: none"> This mitigation will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	<ul style="list-style-type: none"> The impact associated with the construction of car parking or working areas has been assessed as 'not significant'. However, this mitigation measure is proposed as a measure of best practice in order to protect existing trees. Any damaged trees to be re-planted at the end of Care and Maintenance Preparations.

Environmental Impact	Mitigation Measure	Action	Comments
Noise and Vibration			
<p>Local residential properties, recreational areas & industrial receptors</p> <ul style="list-style-type: none"> • General changes to noise directly from the site and associated changes in traffic. 	<p>As appropriate:</p> <ul style="list-style-type: none"> • Use of equipment fitted with effective silencers where practicable. • Appointment of a site contact to whom complaints/queries about construction/demolition activity can be directed - any complaints to be investigated and action taken where appropriate. • Local residents informed of exceptional activities. • No potentially significant external working outside of normal working hours without prior agreement with the local authority. • All construction activity to be undertaken in accordance with good practice as described by British Standard 5228:1997 Noise and Vibration Control on Construction and Open Sites. This includes minimising unnecessary revving of engines, turning off machines when not required and routine maintenance of equipment. 	<ul style="list-style-type: none"> • These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	
Socio-economic			
<ul style="list-style-type: none"> • No significant adverse environmental impacts identified arising from decommissioning activities during this phase. 			

Environmental Impact	Mitigation Measure	Action	Comments
Surface Waters			
<ul style="list-style-type: none"> The potential release of turbid and/or contaminated water from decommissioning activities on the site. 	<p>Where necessary:</p> <ul style="list-style-type: none"> Wetting down (e.g. excavation or construction/demolition areas) to prevent windblown spread of dust into locations where subsequent washing into surface water drains would be likely, and appropriate management of wastewater arising. On-site roads to be regularly kept free from mud/dust deposits, including the use of re-circulating water wheel washers and road cleaners as appropriate. Sheeting or seeding of any long term stockpiles of soil to reduce wash-off of suspended solids. Careful design and siting of spoil mounds as necessary to manage run-off, including use of low walls around such mounds if appropriate. See also measures under geology, hydrogeology and soils in relation to turbid and/or contaminated water entering the storm drainage system. 	<ul style="list-style-type: none"> These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	<ul style="list-style-type: none"> Wheel washing addresses dust, ecology, geology etc. and highways impacts also.
<ul style="list-style-type: none"> Potential minor spills and leaks of non-radioactive substances. 	<ul style="list-style-type: none"> Careful siting of concrete plant and fuel/chemical handling facilities according to EA Pollution Prevention Guidance (PPG) Notes 5 and 6. Bunding of chemical and fuel storage according to PPG2, PPG5 and PPG6. Oil separation facilities on the surface water drainage system at appropriate locations. Appropriate protocols for chemicals and fuel handling in line with EA PPG6 and PPG11, with trained staff only to operate facilities. Emergency/spill response planning according to PPG21; including spill kits kept on site and trained staff available at all times. 	<ul style="list-style-type: none"> Routine control will be enforced through existing site procedures. Any additional requirements will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. 	
Traffic and Transport			
<ul style="list-style-type: none"> Impacts on safety on roads (Fosse Lane, Hill Lane, The Naite). 	<ul style="list-style-type: none"> No specific mitigation is possible because of the absence of specific accident clusters and causes and/or because the routes benefit from accident records at or below the national average. However, a Travel Plan will be implemented which will encourage communal transport or car sharing (see Appendix C). 	<ul style="list-style-type: none"> Development of a Transport Management Plan to encourage communal transport or car sharing. 	<ul style="list-style-type: none"> These mitigation measures will be re-considered on the basis of repeat traffic surveys prior to final site clearance.

Environmental Impact	Mitigation Measure	Action	Comments
<ul style="list-style-type: none"> Environmental Impacts e.g. proximity of vehicles to pedestrians, pedestrian amenity and mud on roads etc. 	<ul style="list-style-type: none"> No specific mitigation is possible because of the absence of specific accident clusters and causes. However, a Travel Plan will be implemented which will encourage communal transport or car sharing. Wheel washing of HGVs as necessary. 	<ul style="list-style-type: none"> These mitigation measures will be considered as part of the environmental, health and safety justification produced as part of individual decommissioning project plans. The mitigation measures will be considered as part of the development of the Transport Management Plan 	<ul style="list-style-type: none"> These mitigation measures will be re-considered on the basis of repeat traffic surveys prior to final site clearance. Wheel washing addresses dust, ecology, geology etc. and surface waters impacts also.

Activities where mitigation may be required but specific measures cannot yet be selected (Condition 3b)

Environmental Impact	Mitigation Measures Under Consideration
No such activities have been identified.	

Activities where mitigation may be required but it is not yet possible to identify possible mitigation measures (Condition 3c)

Environmental Impact
Additional mitigation measures (or any changes required to those measures listed above) for activities during final site clearance will be based on the technologies available at that time, decommissioning experience and any future environmental assessment deemed necessary. In particular, repeat ecology and traffic surveys, the former including bat, protected species and breeding bird surveys, prior to final site clearance are proposed followed by a reconsideration of the appropriate mitigation measures.

6. Site Management and Decommissioning

6.1 General Site Management

Hours of Work

Current normal working hours are between 07:25 and 17:00 hours, Monday to Thursday. Most decommissioning work on site will also be undertaken during these hours under a single shift working arrangement, but this may alter for certain activities. For example, from time to time the working day may be extended and/or some weekend (Fri-Sun) or night-time working may be required in order to complete specific items of work such as concrete pouring. Seven days a week, 24 hours a day shift working may be necessary for retrieval of operational ILW and for subsequent waste packaging operations. South Gloucestershire Council will be notified in advance of any potentially significant work outside of regular Monday to Friday working hours and will be provided with a site contact in the event of any queries or complaints.

Lighting

The existing night-time illumination of the site consists mainly of internal lights within the transparently clad parts of the reactor building together with low level 'street' lights.

During Care and Maintenance Preparations and Final Site Clearance, further lighting may be necessary at times. Use of such lighting, which would only normally be used at the start and end of the working day during the winter months, will be at the discretion of the relevant Site Supervisor. Should significant additional lighting be required close to the river bank, advice will be sought from Natural England.

During Care and Maintenance it is expected that there will be occasional low level 'street' lighting on service roads, provided for staff attending site during the hours of darkness, and lighting activated by site security systems.

Transport

Vehicle movements to and from Oldbury will be subject to the provisions of a Transport Management Plan (see Appendix C).

6.2 Decommissioning Methods

Conventional Area Decommissioning

Conventional plant and buildings will be de-planted and demolished using standard construction industry methods. The exact methods to be employed will be detailed in method statements for individual projects.

The interior of buildings will be first de-planted and decontaminated as necessary prior to demolition of the buildings themselves. To facilitate this, large or heavy plant/equipment may be cut or split into components or sub-component parts prior to their removal. It is expected that after de-planting *etc.* is complete, demolition will be carried out using conventional methods. All buildings will be demolished in their entirety, the structures including any cabling removed to ground level and the voids backfilled where appropriate.

Work is progressing, by both Magnox and the Environment Agency, which aims to provide the Site with the regulatory framework to retain suitable demolition material from conventional buildings, to be re-used as appropriate.

The only existing road/hard standing to be retained into Care and Maintenance will be the road that enters the main gate, turns right and passes round the reactor building and radioactive waste storage building before returning to the main gate *via* the same approach. Otherwise, most existing hard standings, paths and roads will be punctured to assist the growth of vegetation. A car park will be retained into the Care and Maintenance period.

Demolition of Radioactive Facilities

Radioactive plant in the reactor building will be decontaminated, where practicable, and dismantled. Plant and equipment will be decontaminated in situ and recycled, also where practicable to do so. Examples of these decontamination processes are shown in Box 5. Contamination control provisions will be applied (e.g. work will be done within temporary enclosures) and working procedures will take account of the requirement to minimise workers exposure to radiation to As Low As Reasonably Practicable (ALARP).

Following decontamination and de-planting, buildings scheduled for demolition during Care and Maintenance Preparations will be demolished, using conventional techniques. Monitoring checks will be made on the building as demolition proceeds and on the resulting demolished materials prior to disposal.

Box 5: Examples of Decontamination Techniques

- **Chemical decontamination** involves the use of chemicals to remove the surface contamination
- **Scabbling** involves the physical removal of surface contamination, predominantly on concrete
- **Shot blasting** uses high velocity shot to remove surface contamination
- **Water jetting** involves the use of a pressurised water jet to remove surface contamination
- **Wipe down** where decontamination is removed by 'wiping'; specialist equipment and materials are usually required

6.3 Waste Management

Intermediate Level Radioactive Waste (ILW)

Various types of Intermediate Level Waste (ILW) have arisen during the generation, defueling and decommissioning phases of Oldbury Site. During this reporting period ILW waste types are relevant, namely;

- ILW IonSiv High Dose Rate Cartridges and Filters previously retrieved from the Ponds
- Miscellaneous Contaminated Items (MCI) from Waste Cells 1 and 2, Interim ILW Store Building B75 and the Pond Water Filtration Plant (PWFP) Spent Filter Store.

These are discussed in turn below.

1) ILW IonSiv High Dose Rate Cartridges and Filters retrieved from the Ponds

As discussed in previous Environmental Management Plans, 10 DCIC MOSAIKs® have been successfully packed with ILW IonSiv High Dose Rate Cartridges and Filters and conditioned using the Ambient Temperature Conditioning System (ATCS) by 31st January 2019. The 10 DCIC MOSAIKs® were then moved to a Temporary Store within Oldbury Site. This is a facility which has been adapted to include heaters and a dehumidification unit to ensure the packages are maintained at their optimal environmental conditions as per operating and storage instructions stated by the Design Authority.

Four of the DCIC MOSAIKs® (IP2 MOSAIKs®) met the IP-2 Transport Licence and were transported to the Berkeley Interim Storage Facility (ISF) in March 2019. Six DCIC MOSAIKs® remain managed at Oldbury in the Temporary Store until the Type B (M) Transport Licence and specialised transport equipment becomes available.

2) Miscellaneous Contaminated Items (MCI) from Waste Cells 1 and 2, Building B75 and the PWWP Spent Filter Store

The Station Waste Cells have been utilised for a number of years during multiple phases of Oldbury's lifecycle. The Waste Cells were used to store a large array of Miscellaneous Contaminated Items e.g. fine filters, vacuum debris etc. MCI Phases 1&2 were completed between 2018 and 2019 and comprised the waste from Waste Cells 1 & 2, PWWP Spent Filter Store and Building B75 (an additional ILW Buffer Store) being retrieved, sorted, segregated, characterised and repacked into drums. Approximately half the drums were characterised as Low Level Waste (LLW) and were processed as LLW throughout 2019. Re-characterising waste previously thought to be ILW as LLW is in keeping with the waste hierarchy ensuring that only the minimum ILW is processed and stored in the UK's limited facilities.

MCI Phase 3 began in mid-2019, which included loading the characterised MCI into Type VI Ductile Cast Iron Containers (DCICs) using a purpose-built Contamination Controlled Area C3 facility; throughout 2019 and 2020 3 DCICs were filled and transferred to the Temporary Store. Two of these DCICs were consigned to the Berkeley Interim Storage Facility (ISF) in July 2021 and the third was consigned in January 2022.

MCI Phase 4 began in February 2021 which saw a fourth DCIC being delivered to site and initial loading commenced in March 2021. During 2021 MCI sand was retrieved from the Station Waste Cells, dried, characterised and repacked into drums. The LLW sand will be loaded into this DCIC later this year with the remaining MCI and will be consigned to the Berkeley ISF during 2022.

Photographs 3 and 4: Type VI DCIC loading and consignment



Low Level Radioactive Waste (LLW)

Operational LLW routinely arises at nuclear power stations. Because of this, LLW management facilities already exist on site to process and package LLW before it's dispatched for onward treatment or disposal through a contract with the Low Level Waste Repository (LLWR) (now part of Nuclear Waste Services (NWS)). The site has now entered its decommissioning phase, and wastes arising from these activities are processed on site prior to consignment off-site, utilising the LLWR (NWS) contract with the aim to divert LLW from the LLWR facility near Drigg in line with the National Waste Programme.

In total during the reporting period all consignments of radioactive waste were diverted from the LLWR facility with 2 metallic recycling consignments, 5 combustible consignments and 2 vLLW consignments being made.

Non-radioactive Hazardous Wastes

All hazardous wastes are managed by contractors who hold the appropriate Carrier's Licence. Hazardous waste is taken to permitted facilities which have been checked and approved. The specific contractor used will depend on the type of waste requiring disposal. Hazardous Waste consignments are accompanied by hazardous waste consignment notes. All records are auditable and are checked regularly.

Asbestos

Insulation containing asbestos is removed under stringent safety conditions using specialist personnel working in tented areas subject to airlocks and a negative air pressure system. All work will be carried out in strict accordance with the Control of Asbestos at Work Regulations 2012.

Non-radioactive asbestos disposal is sent to authorised off-site licensed asbestos disposal sites. Contractors' licenses are checked before the contract is placed. Once the contract is implemented, it is the contractor's responsibility for meeting the nationally set controls for disposal of the waste through approved landfill sites, and the requirements of the Carrier's Licence.

Oldbury have not commenced bulk asbestos removal at this time in the decommissioning lifecycle but small asbestos strips and repairs have been carried out and any asbestos waste disposed of accordingly.

Other Wastes

Non-radioactive waste materials have arisen throughout the operating life of Oldbury. The management of waste at Oldbury aims to minimise the need to use landfill by reducing waste volumes wherever possible by following the waste hierarchy of waste management. Oldbury follows the Environmental Protection Act 1990 Duty of Care principles for all waste arisings and where waste is transferred, it is accompanied by a transfer note and a full written description of the wastes.

Sewage plant maintenance has resulted in several tankers of sewage requiring to be disposed of from the Site.

Non-radioactive effluent continues to be disposed of to the River Severn in accordance with Oldbury's discharge permits under the Environmental Permitting (England and Wales) Regulations 2016. Discharges under these permits include rain water and fully treated effluent from the site sewage treatment plant.

7. Changes to the Environmental Management Plan

Where previously funding constraints have had an impact on Oldbury, this year (22/23) Oldbury is fully funded and the Turbine Hall demolition project continues to progress. A number of the ILW projects are also planned to commence although resourcing is currently delaying project kick-off. It is also planned that the Sites Lifetime Plan (LTP) will be further updated to reflect learning across the Magnox fleet. The current Care & Maintenance entry date has gone back several years to ~2033 and this may be impacted further when a full review of the LTP is completed. These changes in planned dates will impact the Oldbury Site Licence Condition 35 (Decommissioning) milestones. Therefore, these milestone changes require justification following the company procedures and will require permissioning from the Office for Nuclear Regulation. These changes in planned timescales have been reviewed and there are no significant adverse environmental impacts.

8. Decommissioning Activities

A number of decommissioning projects have been undertaken at Oldbury Site in 2021/22. This section summarises these projects under the headings; Oldbury Cooling Pond, Asset Management, Site Restoration, Plant and Structures, ILW Programmes and Site Restoration.

8.1. Oldbury Cooling Pond

The Oldbury Cooling Pond Decommissioning Project commenced in April 2016. The initial phase of work comprised the radiological characterisation of waste streams to allow for compliant storage and disposal. The project has since completed bulk waste retrievals from the pond basin, drain down and discharge of all pond water and decontamination of the pond basin. Final characterisation of the pond basin is now complete and deplanting of ancillary plant and equipment is underway, preparing the pond building for entry into Care and Maintenance.

Significant hazardous work has been successfully and compliantly completed in challenging conditions such as high radiation and contamination requiring C3/C4 working (Respirator and full change).

LLW skip size reduction

Size reduction of the 100 LLW skips that were in temporary storage on the Pile Caps has commenced. This utilises the process and methodology that was successfully deployed to size reduce the 25 ILW skips back in 2018. Up to the end of the period this report covers, 70 skips had been size reduced.

As part of the size reduction campaign, the need to sample the skips at Oldbury has also been incorporated into the process. At the end of the LLW size reduction campaign, the required number of ILW skips will also be sampled, thereby completing sampling of the entire skip population at Oldbury.

Photograph 5: LLW skip size reduction



Pond backout deplant

Deplanting of ancillary items has now commenced, focussing on items that could pose a threat during Care and Maintenance. As such, items that are fixed to the ceiling and that could pose a falling hazard have now been deplanted. Some of the items had low levels of asbestos contamination associated with them and as such an asbestos contractor was used for their removal. The vast majority of this waste has been cleared radiologically and been disposed of as Out of Scope (considered non-radioactive waste).

Work has now moved to the items that were part of the pond water circulation system that lie in the below floor level trench that runs around the perimeter of the pond. One of the heat exchangers that were used to cool the pond water has been deplanted. Once skip size reduction completes, the work focus will revert to trench deplant preparation activities.

Asbestos remediation has also been completed in the Pond Pump Basement which is directly adjacent to, and accessible from, the Pond building. This is in preparation for backout deplant works to commence in this area later in the year, with final draining and clean up of the Wet Sump to be completed first.

Photograph 6: Heat Exchanger being removed from trench



Wet waste sampling

The Pond Project has also been supporting the site by taking samples of the various ILW/LLW wet waste streams currently stored in tanks on site. This is Waste Project scope which the Pond Project is undertaking on their behalf in order to gain characterisation data earlier than currently planned. This will aid the site in making timely decisions regarding the wet waste strategy. All tanks have now been sampled with the samples currently undergoing off site radiochemical analysis, bar the two Sand Pressure Filters in the Pond Filtration Plant, which will be sampled later in 2022.

Photograph 7: Sampling Sludge Tank 2



Pond Joint Management System (Pond Voids)

During an investigation in 2008 it was discovered that elevated tritium levels were present in the Pond Joint management system, often called the pond voids. Pumps were therefore installed within the voids to maintain the pond void water level below that of the ground water, to give a negative pressure gradient of ground water into the void. The pumped water was discharged via the Active Effluent Treatment Plant.

In preparation for the pond entering C&M, a yearlong investigation into the impact of ground water on the pond, now that the pond water has been removed, has been completed. No water was observed in the pond and no increase in radioactivity was identified in any boreholes or in the pond voids as a direct result of the trial.

A BAT assessment has been completed which concluded the preferred option for the ongoing management of the voids was to leave them in their current configuration and continue with the ongoing monitoring regime, but undertake additional monitoring around void 2 and to also drain and stabilise the Wet Sump in the Pond Pump Basement as soon as reasonably practicable. The Wet Sump was drained of bulk liquor in 2021 and its final clean and stabilisation will be undertaken after skip size reduction completes.

8.2. Asset Management

RCA Domestic Water Overlay

The RCA Domestic Water Overlay was featured in 2021's Environmental Management Plan with a view to seeing it to completion within the 21/22 financial year. A series of technical and procedural challenges have been encountered with the commissioning phase of the system; however as of this time the system is ready to put into service, pending final checks and water outlet cleaning/flushing.

The project first came about when a study into the system's effectiveness revealed a potential to improve energy efficiency of the system, alongside improvements to legionella management processes. A project was launched to complete these improvements by bypassing the majority of the system's pipework and installing new, smaller & fit for purpose water heaters.

Photograph 8: One of the existing oversized and inefficient Hot Water Calorifiers



The system is now entering operation, and we are anticipating a very significant improvement in energy efficiency, along with a significant reduction in our Legionella flushing & mitigation requirements. A second stage of the project will then commence to completely remove the R1 leg of the water main, further reducing the amount of water storage in the system, and running it off a brand new R2 water line only. This is due for completion in 22/23. Completion and commissioning of the final system is planned for May 2022, from which point we anticipate a significant reduction in energy usage in the RCA.

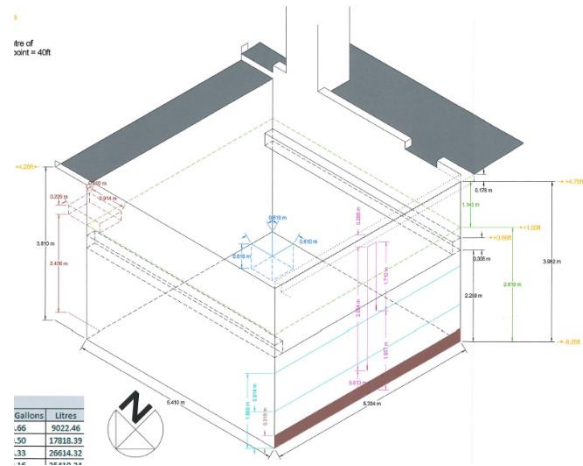
Photographs 9, 10 and 11: The newly installed “Megaflo” Calorifiers and small localised heaters



[Turbine Hall Dirty Drains Clean-Out](#)

The effluent clean-out and floor replacement of the Turbine Hall Dirty Drains commenced this period, and is due to complete in May 2022.

Photograph 12 and Image 1: The Turbine Hall “Dirty Drains Pit” currently being drained and refurbished



The scope of this project is to drain the pit of its water, remove the ~300mm layer of effluent (believed mostly to be made up of silt) by flushing and vacuum pumping, and clean out the pit. The overhead mezzanine floor will then be replaced with new GRP flooring, giving the pit a long service life going forward.

[Main Water Treatment Plant \(MWTP\) Sumps & Active Effluent Treatment Plant \(AETP\) Bulk Acid/Caustic Tanks Clean Out](#)

A significant 2-phased project was completed in 21/22 to drain out and clean both the MWTP Sumps, and the AETP Bulk Acid & Caustic tanks.

[Main Water Treatment Plant \(MWTP\) Effluent Sumps](#)

The MWTP Effluent Sumps A&B were used for the lifetime of the MWTP as a storage area for process water arising from the operation of the plant. The effluent seen inside the tanks at the end of their life included Ion Exchange Resins, salts and glass, in a slightly alkaline mixture. The Sumps needed to be cleaned out to remove any potential hazard prior to the demolition of the Turbine Hall.

Photograph 13: The MWTP Effluent Sump A & B Internals



The dry effluent was removed through a combination of mechanical removal by hand, washing through & vacuum pumping. Approximately 4 tonnes of effluent was removed from the two sumps, leaving them clear of hazards and dry for the upcoming demolition of the Turbine Hall.

[AETP Bulk Acid & Storage Tanks](#)

As the only remaining bulk storage of hazardous chemicals on site at the start of this year, the Active Effluent Treatment Chemical Tanks presented the greatest potential Environmental spill hazard on site. The removal of the 13 tonnes of Acid (Sulphuric Acid) and 34 tonnes of Caustic (Sodium Hydroxide) would provide both a significant benefit to Environmental and Conventional safety, and enable works towards repurposing the area for Waste Projects.

Photographs 14 and 15: The AETP Acid & Caustic Tanks draining operation, and the sludge encountered in



The draining operation was completed under carefully controlled procedures, to ensure no contamination of Acid with Caustic, and vice versa.

The Caustic draining was successfully completed with 2 full tankers being removed to be sold on as clean Sodium Hydroxide. The Acid removal was more complex, with approximately 1 tonne of acid sludge being encountered at the bottom of the tank. This was removed by careful washing through with water, and removal of the dilute mixture by a further 2 tankers.

The tanks are now declared clear of the bulk hazard, with only minor sludges left to be dealt with carefully during demolition of the tanks themselves, scheduled for 22/23.

8.3. Intermediate Level Waste Strategy

The waste management strategy for all ILW streams is detailed in the site's LC35 decommissioning programme and is described in the Oldbury Site Radioactive Waste Management Case. The majority of the ILW will be retrieved from its current location during C&M Preps and packaged into Ductile Cast Iron Containers (DCICs). Methods to be used will be waste stream specific, with some ILW requiring pre-treatment (either by size reduction or drying). There may also be a requirement for conditioning, to create a waste package suitable for interim storage and final disposal.

Packaging proposals for each waste type are set out in Letter of Compliance (LoC) submissions which endorse the disposability of that specific design of waste package. ILW packages may be stored on site in an intervening stage; prior to inter-site transfer to the Berkeley ISF or in the case of ILW Pond Skips to the Hinkley 'A' where they will be encapsulated and stored in the Hinkley ISF, pending transfer to the national Geological Disposal Facility (GDF) when available.

MCI Sort, Segregation & Characterisation

After completion of a Sorting, Segregation and Characterisation campaign of MCI by Waste Operations a Waste Loading Plan was developed. The Project – MCI Phase 3- to fill DCICs with the characterised MCI began in mid-2019 and will continue in 2021. To date three DCICs have been filled with plans for 1 more DCIC to be filled in the short term, more detail can be found in section 6.3. The remaining MCI will be characterised and filled into further DCICs in the future.

ILW Skip Store

27 ILW Pond Skips currently remain in the 9th Floor Fuel Buffer Store awaiting transport to Hinkley for encapsulation. The number of ILW Pond Skips may increase as characterisation data is being reviewed and this may lead to more pond skips being re-categorised as ILW.

The date for transfer is awaiting approval of planning permission and the completion of the storage and packaging facilities currently being constructed at Hinkley. When the planning permission is agreed and the facilities (storage and encapsulation) are ready, appropriate transport processes and procedures will be put in place and a change assessment under the EIAD regulations will be completed.

Sand, Sludge and Resin

Sampling of tanks and vessels which contain Sand, Sludge and Resin is progressing with the majority of tanks and vessels now sampled. A number of samples have been sent off for characterisation and this work will continue in the forthcoming year.

Work is also underway to procure a Sludge, Sand and Resin Fill House. This Fill House uses vacuum technology to empty tanks into DCICs and has been used at other Magnox sites.

Fuel Element Debris

Currently, no additional physical work has been carried out. A further BAT workshop is planned in the forthcoming year to look at the disposal strategy for the FED vaults at Oldbury.

Funding restraints and higher priorities at other Magnox sites have resulted in changes to planned project retrieval start dates. When settled and taking in learning from other sites, full processes and procedures will be developed.

8.4. Site Restoration and Land Quality Investigations

Oldbury Site has 26 Areas of Potential Concern (APCs) with respect to land contamination. An APC is an area of land subject to a past or current use that may have given rise to contamination of the ground or groundwater, or where contamination is known to be present.

Two of these APCs relate to accidental releases of Pond water, one occurred in 1976 when a pipe from a chiller unit ruptured and a second was identified in 2013 when a seepage route from the ponds Joint Monitoring System (JMS) was identified. The pond has now been drained, so no longer provides an ongoing source of contaminants. Both APCs are fully modelled and are shown to be contained on site posing no notable risk to the environment.

A site wide monitoring programme is in place in accordance with company procedures. Monitoring is targeted to these two APCs but covers the whole site and includes a suite of radiological and non-radiological contaminants.

Routine quarterly groundwater monitoring was conducted as planned in March, June, September, and December 2021. No adverse trends were recorded.

8.5. Plant & Structures Programme

Substation

The National 132kV Substation is now in contract to remove all hazards, deplant & demolish the structures to slab level. Work commenced in September 2021 with the removal of the Asbestos Insulation Boards (AIB) from the internal surfaces, this work is planned to be completed by May 2022 when the next task will be to remove the Galbestos external cladding before final demolition of the remaining structures, current forecast is for this to be completed by the summer of 2022.

All supporting documentation has been submitted with reference to the consents needed to complete the demolition work. This includes permitted development rights, ecology surveys & demolition permits. The project team is working through the process to ensure all relevant permissioning work is complete.

Turbine Hall

Turbine Hall demolition enabling works have continued in the last year with the continuation of removing services from the Turbine Hall complex and agreeing the isolation strategy. Isolating the Turbine Hall (cutting of all electrical cables and services) will commence in 2022. The subsequent deplant and demolition is scheduled to take place in 2026. There is no evidence that bats hibernate or birds nest in the turbine hall, but surveys and mitigations for nesting birds, bats and all relevant wildlife will be included when planning prior to demolishing the building. Requirements of the EIADR Environmental Statement will be central to the decommissioning project, including minimising off-site impacts e.g. on the Severn Estuary protected site, and on-site impacts e.g. dust and waste management.

New Site Accommodation

As part of the Turbine Hall demolition works a number of buildings will need to be vacated i.e. the Administration Building, Canteen, Medical Centre etc. Porta cabins used at Bradwell site have been repurposed for use at Oldbury site actualising the first principle of the waste hierarchy, to reuse where possible. The accommodation strategy has been developed and ground suitability

work was carried out to determine where best to place the cabins. Two on-site trees were removed to allow access to the new accommodation area; however the project team are working with the Environmental advisor to ensure suitable mitigations are included in the design to offset any adverse effects in terms of habitat loss and staff wellbeing. Works will continue throughout 2021 and into 2022 to install the porta cabins and relocate people to north-east of site away from the future demolition areas.

Cooling Water (CW) Culvert Sealing

The CW Inlet & Outlet Culverts at Oldbury have been permanently sealed from the River Severn.

All culverts have been filled with around 66m³ of concrete at the Turbine Hall end.

8.6. Activities planned in 2022/23

Activities planned for 2022/23 are:

Ponds Project;

- Complete pond ceiling deplanting and Pond building and Flask Corridor back-out
 - Continue back out of Pond building and Flask Corridor
 - Continue Pond Filtration Plant decommissioning enabling and commence deplanting works
 - Size reduction of remaining ~30 out of 98 LLW skips and transfer to 7th floor buffer store until characterisation is finalised.
- Complete sampling of available sludge, sand and resin tanks and send samples for off-site characterisation
 - Continue procurement of Sand, Sludge and Resin Fill House Vacuum System
 - Commence preparations for procurement of Advanced Vacuum Drying System building including re-applying for planning permission (Note: original planning permission expired February 2021)
 - Continue targeted asbestos remediation
 - Complete Turbine Hall Dirty Drains Clean Out
 - MCI – Complete fill of fourth DCIC
 - Empty Anion and Cation A & B Vessels of Resin
 - Investigate possibility of emptying further small vessels of Sand, Sludge or Resin
 - Plant & Structures;

- Continue Turbine Hall isolations
- Continue NGC 132kV Sub Station building deplant and demolition (including other small buildings in the area)
- Complete new accomodation installation

APPENDIX A

Letter Providing Consent to Decommission and Attached Conditions

Decommissioning Project Consent No.1

18 February 2008

NUCLEAR REACTORS (ENVIRONMENTAL IMPACT ASSESSMENT FOR DECOMMISSIONING) REGULATIONS 1999

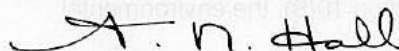
CONSENT

granted under regulation 4(b)
in accordance with regulation 8(3)
with conditions attached under regulation 8(4)

OLDBURY POWER STATION

The Health and Safety Executive, for the purposes of regulation 4(b) in accordance with regulation 8(3), grants consent for carrying out the project¹ applied for under regulation 4(a), in particular, to remove all buildings except the reactor buildings, alter the reactor buildings for a period of deferment, retrieve and package operational intermediate level waste, and store the intermediate level waste until it can be removed from site, and clear the site, subject to the conditions under regulation 8(4) attached.

Dated: 18 February 2008

Signed 

**For and on behalf of the
Health and Safety
Executive
Dr A N Hall**

**A person authorised to act
in that behalf**

¹ Project as defined in regulation 2

Conditions attached to Decommissioning Project Consent No.1 18 February 2008

**NUCLEAR REACTORS (ENVIRONMENTAL IMPACT ASSESSMENT FOR
DECOMMISSIONING) REGULATIONS 1999**

CONDITIONS

attached under regulation 8(4)
to Decommissioning Project Consent No. 1 granted under regulation 4(b)

OLDBURY POWER STATION

Condition 1

The project¹ shall commence before the expiration of five years from the date of this Consent.

Condition 2

(1) The licensee is required to prepare and implement an environmental management plan to cover mitigation measures to prevent, reduce and where possible offset any significant adverse effects on the environment.

(2) The project shall not be carried out except in accordance with the environmental management plan.

Condition 3

Within 90 days of the date of this Consent, with reference to the environmental statement provided under regulation 5(1) and evidence to verify information in the environmental statement, provided under regulation 10(9), the environmental management plan shall:

- a. list the mitigation measures that are already identified in the environmental statement and evidence submitted to verify information in the environmental statement;
- b. list the options to implement work activities where mitigation measures may be required but where selection of an option will only be possible in the future;
- c. list the work activities where mitigation measures may be required but where assessments to identify mitigation measures will only be possible in the future.

Condition 4

Subsequent to condition 3, the environmental management plan shall:

¹ Project as defined in regulation 2

- a. with reference to condition 3b, identify the mitigation measures for options that have been selected, giving reasons for their selection;
- b. with reference to condition 3c, identify the mitigation measures from assessments carried out, giving reasons for their selection;
- c. describe the effectiveness of the mitigation measures over time;
- d. describe significant changes to the mitigation measures in light of experience, giving reasons for such changes.

Condition 5

The licensee is required to:

- a. provide the environmental management plan to the Health and Safety Executive within 90 days of the date of this Consent and every year thereafter, or within such longer time as the Executive may agree;
- b. make the environmental management plan available to the public within 30 days of the plan being sent to the Health and Safety Executive, or within such longer time as the Executive may agree; the plan may replace earlier versions.

Condition 6

The licensee is required to provide notice to the Health and Safety Executive of any significant change to a mitigation measure to prevent, reduce and where possible offset any major adverse effects on the environment no less than 30 days before the change is made, or within such shorter time as the Executive may agree.

Dated: 18 February 2008

Signed A. N. Hall

For and on behalf of the
Health and Safety
Executive

Dr A N Hall

A person authorised to act
in that behalf

Appendix B

Example Environmental Risk Assessment Form

Environmental Risk Assessment Form

Work Location:				
Work Description:				
No.	Parameter	Consider Potential For (<i>In the absence of mitigation</i>):	No	Yes
1	Discharges / Permit (Liquid)	In the absence of mitigation, does the work have the potential to breach an existing Environmental Permit, challenge any of the conditions or require a new Environmental Permit?		
2	Discharges / Permit (Gaseous)	In the absence of mitigation, does the work have the potential to breach an existing Environmental Permit, challenge any of the conditions or require a new Environmental Permit? This includes any potential impact on Greenhouse Gas Emissions Permit?		
3	Liquid Substances / Containment	Will the work involve the use, generation or storage of chemicals, oils, fuels, or other hazardous liquids and/or have the potential to impact the integrity of existing liquid containment <i>E.g. tanks, bunds in the absence of mitigation?</i> Note: A COSHH assessment must be provided for all chemicals and hazardous substances used		
4	Other Licenses / Consents	Does the work require any other environmental licenses, authorisation, consents or registration <i>E.g. wildlife management license, marine consents, PCB registration?</i>		
5	Drainage	Will the work impact or have the potential to impact any site drainage systems e.g. changes to configuration, cleaning In the absence of mitigation is there any potential for substances to enter the drainage system or lead to damage to the system?		
6	Land Quality	Could the work have significant impacts on land quality or groundwater in the absence of mitigations? This includes potential for any ground or groundwater contamination (spillage), changes to groundwater levels and flows or mobilisation of contaminants? Where excavations affecting the Sub-surface (unmade ground) are proposed tick Yes and a separate Land Quality Assessment will need to be provided by an Environmental SQEP to accompany this form.		
7	Noise, Vibration & Light	Could the work have a significant effect on noise, vibration or light levels to site staff or local residents in the absence of mitigation?		
8	Plant / Equipment	Does the work involve bringing plant / equipment onto site containing hazardous substances? Does the work involve breaking into systems which could have the potential to contain hazardous liquids or gases? <i>E.g. chemically dosed water systems, oil filled cables, Ozone Depleting Substances?</i> Will the work result in changes to plant configuration or leave residual hazard which will need to be managed and updated on the aspects register? <i>E.g. Operational to Redundant plant which may be bulk drained but contain residuals</i>		
9	Air Quality & Dust	Could the work have a significant impact on air quality and dust in the absence of mitigations? E.g. emissions of gaseous pollutants and particulate, raising and dispersion of dust (or creating dust source such as stockpiled material) both on and off site.		
10	Ecology	Could the work have significant impacts on ecology in the absence of mitigation? This includes impacts to protected species and habitats, such as working near the estuary or buildings used for nesting etc.?		
11	Traffic & Transport	Could the work have significant impacts on traffic and access in the absence of mitigation? Consider significant increase in HGV traffic on/off site, disturbance to local residents, impacts on safety / environment, mud on roads etc.		

12	Landscape & Visual	Could the work have significant impacts on landscape and views in the absence of mitigation? This includes visual changes to exteriors of buildings and structures, or landscape changes within the site boundary.		
13	Socio-economic	Could the work have significant impacts on socio-economic factors in the local population in the absence of mitigation? This includes changes to employment and expenditure, accommodation and housing and local services etc.		
15	Material Management	Will the work require the management of material or treatment of waste for the purposes of reuse on site <i>E.g. infilling voids, adoption of CL:AIRE Protocol</i>		
16	Resources	Will the work lead to a significant increase in resource use (e.g. energy, water, diesel / fuel, chemicals, change the carbon footprint or any other changes that might require a review of the Environmental Aspects Register?		

For any parameters ticked yes, identify in the table below the mitigations to be implemented for each:

No.	Parameter	Mitigation to be Implemented						
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; border: none;">NRE / Site Engineer Name:</td> <td style="width: 33%; border: none;">Signature:</td> <td style="width: 33%; border: none;">Date:</td> </tr> <tr> <td style="border: none;">Environmental SQEP Name:</td> <td style="border: none;">Signature:</td> <td style="border: none;">Date:</td> </tr> </table>			NRE / Site Engineer Name:	Signature:	Date:	Environmental SQEP Name:	Signature:	Date:
NRE / Site Engineer Name:	Signature:	Date:						
Environmental SQEP Name:	Signature:	Date:						

This Risk Assessment must be completed and signed to be produced at point of work authorisation and retained for the duration of the works. All mitigations must be implemented as described.

Appendix C

Principles for a Transport Management Plan

Objective

All decommissioning operations involving transport will be managed so as to minimise the environmental effects of these operations, as far as is reasonably practicable. The principles for achieving this are defined below.

Transport Management Principles

- HGVs will be required to exit the site through the Main Gate and, where appropriate, to follow preferred routes to and from the strategic road network;
- The numbers of individual transport movements will be minimised as far as is reasonably practicable;
- Employees and contractors will be encouraged to share transport (or use public transport) when travelling to and from the Oldbury Site;
- Magnox Limited and their contractors will be required to maintain their vehicles in a good standard of condition;
- When appropriate, vehicles leaving the site will be subject to wheel wash and inspection to ensure that earth and other material is not unduly dispersed;
- On site roads will be swept as necessary to minimise the spread of material off-site and/or into drains or watercourses;
- Signage will be provided at site exits to reinforce the contract requirements on vehicle drivers;
- Where practicable, transport distances will be minimised by the use of local recycling companies, disposal sites, etc.;
- Most HGV transport movements will be undertaken during normal working hours; and
- In the event of need for an abnormal load to be transported, a specific plan for this movement will be developed.