

## Wylfa Newydd Project Site Preparation and Clearance Application

Environmental Management Plan  
Management of Made Ground and Land Contamination Procedure





## Table of Contents

<b>1 Introduction</b>	<b>1</b>
Purpose and Applicability .....	1
Scope .....	1
Terms and Definitions.....	1
Responsible Parties.....	4
Parties Supporting the Procedure.....	7
<b>2 Management of Made Ground and Land Contamination</b>	<b>10</b>
Remedial Strategy and Implementation.....	10
Materials Management.....	12
Record Keeping.....	14
<b>3 Verification</b>	<b>14</b>
Sampling .....	14
Made Ground.....	14
Assessment Criteria .....	16
Land Contamination .....	16
Asbestos and ACM.....	17
Materials Affected by Unexpected Contamination .....	18
Waste for Off-site Disposal / Recycling .....	19
<b>4 Verification Report</b>	<b>19</b>
<b>5 References</b>	<b>19</b>

## List of Tables

Table 5.1 Terms and Definitions.....	1
Table 6.1 Horizon Responsible Parties .....	4
Table 6.2 Contractor Responsible Parties .....	7
Table 8.1 CAR 2012 Work Categories .....	17
Table 8.2 Asbestos Suitable for Use Criteria .....	17
Table 10.1 References .....	19

## Appendices

- Appendix A: Relevant Pollutant Linkages
- Appendix B: Ground Investigation Reports
- Appendix C: Made Ground Characterisation

# 1 Introduction

- 1.1 The Site Preparation and Clearance works (SPC works) have the potential to impact the environment and human health as a result of encountering made ground and land contamination.

## Purpose and Applicability

- 1.2 This procedure details the requirements for managing made ground and land contamination for the SPC works and is intended to inform and instruct the Contractor undertaking the SPC works to ensure made ground and land contamination are effectively managed to minimise environmental and human health impacts.

## Scope

- 1.3 The scope of this procedure extends to all Horizon owned, leased and option land and to activities carried out on other areas under the instruction of Horizon. It extends to all projects, activities, works and services involved in the site care and maintenance, enabling works (including site preparation and clearance), construction, highways and off site developments.

## Terms and Definitions

- 1.4 Table 4.1 provides a summary of commonly used terms and definitions. The list is not exhaustive; therefore in the case that Horizon staff or persons working on their behalf (e.g. Contractors) encounter a term not detailed below, they should contact the Land Quality Manager or the Head of Environment and Waste in order to get a clear definition.

**Table 1.1 Terms and Definitions**

Term	Definition
ACM	Asbestos Containing Material.
AIB	Asbestos Insulating Board.
APC	Area of Potential Concern.
BAT	Best Available Technique. The legislative requirements whereby operators must demonstrate that certain operations are conducted in the optimum manner, to prevent or minimise releases and limit the impact on the environment, taking a number of factors into account including technological advances, economic feasibility and time.
CAP	Corrective Action Programme. Horizon's system for the reporting and subsequent resolution of all conditions which, if not addressed, could have an impact on SHEQS.
CAR	Control of Asbestos Regulations 2012.
CL:AIRE	Contaminated Land: Applications In Real Environments.
CLR11	Contaminated Land Report 11: Model Procedures for the Management of Land Contamination.
CoP	Code of Practice.

Term	Definition
C4SLs	DEFRA Category 4 Screening Levels for assessment of land affected by contamination.
DEFRA	Department for Environment Food and Rural Affairs. The UK government department responsible for policy and regulations on the environment, food and rural affairs.
DOnGI	Detailed Onshore Ground Investigation.
DoWCoP	Definition of Waste: Development Industry Code of Practice.
EA	Environment Agency. The executive non-departmental public body with responsibility for environmental regulation in England. The Environment Agency is undertaking Generic Design Assessment for the Power Station' UK Advanced Boiling Water Reactors on behalf of UK Government. The Environment Agency provides nuclear regulation services and resources to Natural Resources Wales under a Memorandum of Understanding.
EMP	Environmental Management Plan. A document that sets out the key environmental and planning / consenting considerations that must be taken into account for any works taking place. There will be more than one plan and the development of these plans is an iterative process.
EQS	Environmental Quality Standards. Directive 2008 / 105 / EC sets out environmental quality standards concerning the presence in surface water of certain pollutants and substances or groups of substances identified as priority or "priority hazardous", on account of the substantial risk they pose to or via the aquatic environment. Priority substances are defined by Directive 2000 / 60 / EC (the Water Framework Directive).
EWC	European Waste Catalogue.
GAC	Generic Assessment Criteria.
GI	Ground Investigation.
Horizon	Horizon Nuclear Power Wylfa Limited.
INNS	Invasive Non-Native Species. An invasive non-native species is any non-native animal or plant that has the ability to spread causing damage to the environment, the economy, our health and the way we live.
IOffGI	Intermediate Offshore Ground Investigation.
IOOnGI	Intermediate Onshore Ground Investigation.
JIWG	Joint Industry Working Group.
LQM/CIEH	Land Quality Management Standard Reference / Chartered Institute of Environmental Health.
LQM	Land Quality Manager.

Term	Definition
LQS	Land Quality Strategy.
MMP	Materials Management Plan. A plan that ensures that site won materials that are suitable for use and have a certainty of use are considered materials and not waste, therefore avoiding unnecessary regulatory controls.
MS	Method Statement.
NRW	Natural Resources Wales. The public body whose stated purpose is to ensure the natural resources of Wales are sustainably maintained, enhanced and used, now and in the future. It absorbed the regulatory and advisory duties of the Environment Agency Wales, Countryside Council for Wales and the Forestry Commission in Wales.
PPL	Potential Pollutant Linkage.
PSI	Preliminary Site Investigation.
PWMP	Project Waste Management Plan.
Power Station	The proposed new nuclear power station, including two UK advanced boiling water reactors, associated plant and ancillary structures and features, to be constructed and operated at Wylfa on Anglesey.
Power Station Site	The indicative area of land and sea within which the majority of the permanent Power Station buildings, plant and structures would be situated.
QP	Qualified Person.
RA	Risk Assessment. The overall process of Risk identification, Risk analysis and Risk evaluation (scoring).
RAMS	Risk Assessment Method Statement - Common term used in construction which relates to the risk assessments and method statements required for tasks and activities.
RPL	Relevant Pollutant Linkage.
SEC	Site Environmental Co-Ordinator.
SIC	Standard Industry Classification. A code required for waste transfer and consignment notes.
SPC works	A range of works and activities including site establishment works, site clearance works, diversion of a watercourse, ground improvement works and topsoil works.
SPEN	Scottish Power Energy Network.
SQEP	Suitably Qualified and Experienced Person.
SSSI	Site of Special Scientific Interest. A site designated as being of special interest for its flora, fauna or geological or

Term	Definition
	physiographical features and protected under the Wildlife and Countryside Act 1981.
SWMP	Site Waste Management Plan. The plan establishing waste management protocols for site waste.
S4ULs	LQM / CIEH 'Suitable 4 Use Levels'.
TCE	Trichloroethylene. A halocarbon commonly used as an industrial solvent. It is a clear non-flammable liquid with a sweet smell.
UKAS	United Kingdom Accreditation Service.
Unexpected Contamination Plan	A methodology for managing areas of discovered unexpected contamination.
WAC	Waste Acceptance Criteria. Criteria that wastes have to meet in order to be accepted by treatment and disposal operators.
Waste Duty of Care (DoC)	When waste from a site is given to a waste management Contractor- including waste destined for landfill – the producer of the waste has a legal responsibility to ensure the waste management Contractor is authorised to take it and that it's accompanied by a waste transfer note or consignment note. This is known as waste duty of care.
WNDA	Wylfa Newydd Development Area. The indicative areas of land and sea, including the Power Station Site, the Wylfa NPS Site and the surrounding areas that would be used for the construction and operation of the Power Station. This area is representative of the maximum area extending around the Power Station Site that would be directly affected by Power Station main construction activities and used to form the setting and features of the operational Power Station.
Wylfa NPS Site	The Wylfa site designated by National Policy Statement EN-6 as potentially suitable for the deployment of a new nuclear power station.

## Responsible Parties

- 1.5 Management of made ground and land contamination shall be delivered through specific roles and responsibilities within Horizon and across the supply chain. Horizon will oversee and verify the works undertaken by contractors and their supply chain.

**Table 1.2 Horizon Responsible Parties**

Horizon Responsible Party	Description
Head of Environment and Waste Management	<ul style="list-style-type: none"> <li>Identifying relevant appropriate Suitably Qualified and Experienced Persons (SQEP);</li> <li>Ensuring the SQEPs are aware of their responsibilities;</li> </ul>

Horizon Responsible Party	Description
	<ul style="list-style-type: none"> <li>• Instructing the Head of Permitting to make all necessary arrangements for securing discharge and waste permits;</li> <li>• Coordinating engagement with the regulators regarding land contamination.</li> <li>• Providing advice on made ground, land contamination and waste minimisation and management in the absence of SQEPs.</li> <li>• Delegating these responsibilities to SQEP staff and/or contractors where required.</li> </ul>
Site Manager	<ul style="list-style-type: none"> <li>• Ensuring the relevant information on made ground, land contamination and waste minimisation and management is included in the site induction.</li> <li>• Has the authority to stop works undertaken by Horizon or Contractors which do not fulfil the requirements or expectations of Horizon.</li> </ul>
Land Quality Manager	<ul style="list-style-type: none"> <li>• Ensuring regulatory compliance and compliance with this procedure for all contaminated land and remediation activities on site.</li> <li>• Ensuring any remediation activities carried out on site are appropriately authorised by Natural Resources Wales (NRW).</li> <li>• Checking Contractor licences through the Environmental Agency (EA), NRW and HSE online public registers.</li> <li>• Identifying and updating staff, contractors and subcontractors on the location of the materials storage areas which may change during the lifetime of the project.</li> <li>• Reporting to Head of Environment &amp; Waste any non-compliance with relevant contaminated land legislation and aiding subsequent investigations and reporting through Horizons Corrective Action Programme (CAP).</li> <li>• Liaising with the designated Site Waste Officer (or delegated persons) in connection with materials reuse, waste minimisation, management and disposal matters.</li> <li>• Ensuring all materials are managed, segregated and stored as defined in the contractors' Materials Management Plan (MMP).</li> <li>• Surveying, reviewing and reporting on independent validation sampling of materials for reuse.</li> <li>• Liaising with relevant specialist staff on site as required.</li> </ul>
Site Waste Officer	<ul style="list-style-type: none"> <li>• Ensuring waste compliance for all activities on site.</li> <li>• Identifying and updating staff, contractors and subcontractors on the location of the Waste Storage Area which may change during the lifetime of the project.</li> </ul>

Horizon Responsible Party	Description
	<ul style="list-style-type: none"> <li>• Ensuring effective application of the Waste Hierarchy, as detailed in <i>Conventional Materials and Waste</i> [RD1].</li> <li>• Liaising with the designated Site Manager and Land Quality Manager in connection with all relevant requirements stipulated in the Management of Materials and Waste Procedure [RD2].</li> <li>• Ensuring all waste streams are correctly identified and categorised.</li> <li>• Checking compliance of waste carriers and waste management companies being used by contractors.</li> <li>• Ensuring all waste is managed and segregated as defined in the contractors' Site Waste Management Plan (SWMP) using monthly SWMP reviews.</li> <li>• Ensuring compliance with the waste Duty of Care requirements.</li> <li>• Reviewing, signing and storing paperwork (e.g. waste transfer notes, hazardous waste consignment notes) for wastes removed from the site and office.</li> <li>• Ensuring any waste treatment activities carried out by the site / business are appropriately authorised by NRW.</li> <li>• Promoting reuse, recycling and waste minimisation initiatives for excavated materials.</li> <li>• Checking Contractor licences through the EA, NRW and HSE online public registers.</li> <li>• Maintaining records relating to waste transfer and updating the <i>Waste Management Checklist</i> [RD3] as required.</li> </ul>
Site Environmental Co-Ordinator	<ul style="list-style-type: none"> <li>• Undertaking the responsibilities of the Land Quality Manager when they are unavailable (leave, sickness etc.), provided the Site Environmental Co-Ordinator is formally assessed as SQEP for land quality management issues, and this delegation of authority is done formally (either through the SEC's role description, or by written delegation of authority from the LQM).</li> </ul>
Head of Permitting	<ul style="list-style-type: none"> <li>• Ensuring all relevant waste permits, exemptions or hazardous waste producer registrations and asbestos licences are in place, as agreed with the Head of Environment and Waste.</li> <li>• Ensuring permits are entered on the master permissions list.</li> </ul>

## Parties Supporting the Procedure

Table 1.3 Contractor Responsible Parties

Responsible Party	Description
Contractor (including subcontractors)	<p><u>General</u></p> <p>The Contractor shall:</p> <ul style="list-style-type: none"> <li>• comply with the requirements of this procedure, either through their activities or the activities of others under their control (e.g. subcontractors) that manage made ground and land contamination for reuse, recycling or disposal;</li> <li>• read the following documents in conjunction with this procedure in order to obtain further details and relevant information:               <ul style="list-style-type: none"> <li>- Wylfa Site Preparation and Clearance, Land Contamination Risk Assessment and Remediation Strategy, Jacobs [RD4];</li> <li>- Site Preparation and Clearance: Task A: Technical memorandum – Management of Asbestos Impacted Soils, AECOM [RD5];</li> <li>- SPC Works Information. Part 1: Procurement Specification Summary, Horizon [RD6].</li> </ul> </li> <li>• produce and be compliant with the following documents for Horizon review and acceptance prior to works:               <ul style="list-style-type: none"> <li>- Materials Management Plan (MMP) for their project and procuring the services of a CL:AIRE Qualified Person to approve and verify the MMP;</li> <li>- Site Waste Management Plan (SWMP) or Project Waste Management Plan (PWMP) ;</li> <li>- Environmental Management Plan (EMP), which will set out measures for protection of the environment during the works;</li> <li>- Remedial Strategy and Implementation Plan, to include Unexpected Contamination Plan and Verification Plan;</li> <li>- Verification Report for submission to regulatory stakeholder through Horizon.</li> </ul> </li> <li>• ensure the above documents are written in accordance with and adhere to:               <ul style="list-style-type: none"> <li>- Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste: Development Industry Code of Practice (DoWCoP) and MMP template (CL:AIRE, 2011);</li> <li>- Best Available Technique (BAT);</li> <li>- Town and country planning legislation and policy;</li> <li>- Relevant Codes of Practice (CoP);</li> <li>- Statutory legislation, including, but not limited to, the Environmental Permitting (England and Wales)</li> </ul> </li> </ul>

Responsible Party	Description
	<p>Regulations 2010 and the Environmental Protection Act 1990;</p> <ul style="list-style-type: none"> <li>- The Control of Asbestos Regulations 2012;</li> <li>- Horizon’s Management of Materials and Waste Procedure [RD2];</li> <li>- Horizon’s Wylfa Newydd Master plan Materials Management Plan [RD7];</li> <li>- Horizon’s Wylfa Newydd Site Waste Management Plan [RD8];</li> <li>- Horizon’s Environmental Management Plan [RD9].</li> </ul> <ul style="list-style-type: none"> <li>• ensure all documents are provided to Horizon in a timely manner for review and approval by relevant regulators;</li> <li>• be responsible for obtaining any environmental permits required for operation of any mobile treatment plant and for obtaining consent from Horizon to discharge to site drainage;</li> <li>• review, sign and store relevant paperwork including laboratory certificates for materials to be reused on site;</li> <li>• employ the services of a Qualified Person (QP), as required by the MMP, for the duration of the MMP;</li> <li>• ensure all sub-contractors employed are competent and approved by Horizon;</li> <li>• submit method statements (MS), risk assessments (RA) and work programmes to Horizon which clearly demonstrate the areas of the site to be remediated, sequence of work activities and controls and procedures for managing the works. The MS shall also demonstrate how the Contractor will avoid cross contamination of other materials and areas;</li> <li>• consider and make arrangements to accommodate other activities carried out by others that may be taking place at the time of the works and include, but are not limited to: <ul style="list-style-type: none"> <li>- archaeology surveys;</li> <li>- ecological works including translocation and displacement of affected species;</li> <li>- site clearance including demolition and removal of existing buildings and structures to ground level;</li> <li>- vegetation clearance;</li> <li>- watercourse diversion and installation of temporary site drainage;</li> <li>- interfacing works as outlined in SPC Works Information Part 1[RD6].</li> </ul> </li> </ul> <p><u>Excavation</u></p> <p>The Contractor shall:</p> <ul style="list-style-type: none"> <li>• ensure that the adopted approach for removing excavated soils does not increase the quantity of soils that are unsuitable for reuse or require treatment;</li> </ul>

Responsible Party	Description
	<ul style="list-style-type: none"> <li>• appoint an appropriately qualified and experienced contamination specialist to manage and implement the Unexpected Contamination Plan if required;</li> <li>• undertake validation sampling of materials for reuse, verified through the appointed QP;</li> <li>• identify the most appropriate management route of a material depending on its characteristics and suitability for reuse;</li> <li>• record materials excavated, treated, reused and disposed of on a materials tracker in accordance with the MMP;</li> <li>• close-out the MMP on completion of the project by surmising the difference in forecast and materials excavated and reused onsite and provide explanations for the difference and lessons learnt;</li> </ul> <p>close-out the remediation works with a Verification Report to the satisfaction of Horizon.</p> <p><u>Asbestos</u></p> <p>The Contractor shall:</p> <ul style="list-style-type: none"> <li>• be aware of the presence of asbestos, as detailed in referenced reports, in order to include appropriate finance and programme for remedial works;</li> <li>• include provision for a watching brief by asbestos trained persons;</li> <li>• ensure all staff involved in asbestos related activities are Asbestos Awareness trained;</li> <li>• employ a licensed Contractor to fulfil the requirement under Control of Asbestos Regulations (CAR) for competency during licensed asbestos works unless the Contractor can demonstrate sufficient competency to Horizon;</li> <li>• ensure asbestos excavation and removal works are undertaken in compliance with the requirements of current legislation, regulations and industry guidance.</li> </ul> <p><u>Invasive Non-Native Species (INNS)</u></p> <p>The Contractor shall:</p> <ul style="list-style-type: none"> <li>• be aware of the presence of INNS, as detailed in the referenced documents;</li> <li>• ensure that INNS are surveyed and managed according to the Management of Ecology procedure [RD10].</li> </ul> <p><u>Waste</u></p> <p>The Contractor shall:</p> <ul style="list-style-type: none"> <li>• identify the most appropriate management route for each waste stream, depending on its characteristics and classification as non-hazardous or hazardous waste and in line with the SWMP, Horizon Waste Hierarchy and the Management of Materials and Waste Procedure [RD2];</li> </ul>

Responsible Party	Description
	<ul style="list-style-type: none"> <li>• provide an accurate description of the waste and ensure that it is captured on the waste transfer records. Hazardous waste may be harmful to human health or the environment. If the waste has hazardous properties, it must be treated as hazardous waste and hazardous waste consignment notes used to record its removal and disposal;</li> <li>• consult the European Waste Catalogue (EWC) when classifying the types of waste and using appropriate 6 digit EWC code on transfer or consignment documentation. Where a waste falls under more than one EWC code then the most appropriate EWC code shall be used;</li> <li>• identify the correct Standard Industry Code (SIC) of the activity that generated the waste on transfer or consignment documentation;</li> <li>• comply with all relevant waste legislation and regulation;</li> <li>• provide a list of waste carriers and waste management companies responsible for wastes;</li> <li>• ensure waste carriers or waste management companies are licensed and correctly describe waste;</li> <li>• liaise with the designated Site Waste Officer or delegated Site Environmental Coordinator in connection with materials reuse, waste minimisation, management and disposal;</li> <li>• check and record progress against waste minimisation activities;</li> <li>• maintain records of material type, storage, origin and fate with regards to made ground and land contamination and provide a monthly summary to Horizon;</li> <li>• maintain records relating to waste transfer and waste consignment and provide the Horizon Site Waste Officer with a monthly summary of waste types and volumes including EWC codes and allow Horizon to inspect all waste transfer and consignment notes;</li> <li>• close-out the SWMP on completion of the project by calculating the difference in forecast and actual waste and providing explanations for the difference and lessons learnt.</li> </ul>

## 2 Management of Made Ground and Land Contamination

### Remedial Strategy and Implementation

- 2.1 There is a requirement to undertake minor amounts of remediation in localised Areas of Potential Concern (APCs) as a necessary part of the enabling works in order to break unacceptable Relevant Pollutant Linkages (RPLs). These are outlined in Appendix A.
- 2.2 A full Remedial Strategy and Implementation Plan for each area is required and must be in line with CL:AIRE guidance based on information provided in this procedure and relevant

referenced documents. The Remedial Strategy shall detail the methodology for the design, preparation, implementation, verification, monitoring and maintenance of the remediation.

- 2.3 The remedial strategies proposed in referenced documents are purely indicative and the Contractor may propose alternatives to the remedial recommendations provided, should they wish to place more emphasis upon a particular remediation evaluation criterion.
- 2.4 The Implementation Plan shall include a verification plan which sets out what information will be obtained, and when, during the development of the site so that a permanent record exists of the remediation actions completed to address the identified RPLs.

### **Made Ground**

- 2.5 A series of ground investigations have been undertaken (listed in Appendix B). During these works, Made Ground was characterised into four types based on composition of materials [RD4]. Ground investigation data available should be consulted in order to determine segregation, testing, remediation and disposal requirements.

### **Asbestos and Asbestos Contaminated Materials (ACM)**

- 2.6 Areas of positive asbestos and ACM have been identified during ground investigation works. It is a requirement for the Contractor to undertake further investigation in the areas peripheral to asbestos and ACM hotspots as detailed in Jacobs report [RD4], in order to further delineate asbestos and ACM presence to provide a better understanding of the volumes of made ground containing asbestos and ACM that will need to be dealt with during SPC. Delineation methodology will be derived by the Contractor for acceptance by Horizon. Further details are provided in ACEOMS Technical memorandum [RD5] and paragraph 3.5 to 3.8.

### **Unexpected Contaminated Materials**

- 2.7 Ground investigations undertaken (Appendix B) identified ground conditions and potential contamination however, a potential remains for the presence of unknown, unidentified or unforeseen surface and sub-surface contamination. Therefore, as a requirement of the Remedial Strategy and MMP, an Unexpected Contamination Plan is needed to detail management of any visual / olfactory or other evidence of contamination beyond that already encountered within areas identified.
- 2.8 As a minimum, the Unexpected Contamination Plan shall include procedures for:
- stopping work and notifying Horizon's Land Quality Manager when unexpected contamination is encountered;
  - isolating the affected area or segregating the affected material (if already excavated), with specific guidance to be provided on the management of any potential ACM;
  - where appropriate, undertaking field monitoring using portable instruments to identify, delineate, demarcate and quantify the unexpected contamination;
  - undertaking sampling (including TPH, PAH, VOCs, SVOCs, CLEA metals and asbestos screen) and assessment of the affected area / material;
  - recording of assessment findings and subsequent management of the material within the Verification Report; and
  - liaison, through Horizon, with regulators, if necessary.

**Note:**

**This procedure does not include radioactive contamination which is not expected at the proposed WNDA. However, in the event that radioactive materials are discovered during works, the 'Horizon Sites Radiological Local Rules and Contingency Arrangements' [RD11] shall be adhered to.**

### **Materials Left In-situ**

- 2.9 It is not intended for any contaminated materials, asbestos or ACM to remain in-situ following SPC works. However, in the event that any such materials are left in-situ between phases of work, suitable management of the areas must be undertaken to prevent the escape of contamination and release of fibres. These areas must be demarcated and recorded in the MMP and site hazards and risks plan.
- 2.10 If contaminated materials, asbestos or ACM are to remain indefinitely, previous GI data, available in reports listed in Appendix B, should be consulted and discussed with Horizon to determine whether the area is suitable for final use. In the event that sufficient data are not available, or data are deemed inaccurate, samples must be taken and results compared with target concentrations for suitability for use, as outlined in Section 3, and the area managed accordingly.
- 2.11 Due consideration therefore needs to be made during the pre-planning of the SPC works for future main construction works for the Power Station including the careful management of material movement within the WNDA, and a watching brief for potential asbestos during excavation and stockpiling. Consultation with Horizon will be required to determine the most suitable approach in terms of phases of works.

### **Materials Management**

- 2.12 All excavations will require supervision by a SQEP and materials segregated and stockpiled on the basis of visual and olfactory observations, previous GI data and made ground characterisation (Appendix C) in accordance with the MMP.
- 2.13 Horizon proposes to reuse as much material as possible, with the majority being placed in the landscaped mounds. All materials deemed suitable for reuse will be subject to any relevant processing, testing and regulatory requirements.
- 2.14 Material stockpiles shall be stored in compliance with the MMP and Preliminary Soil Management Strategy [RD12] to prevent having to dispose of materials off-site or having to undertake the works under the Environmental Permitting Regulations (England and Wales) Regulations 2010 (as amended).
- 2.15 These activities shall also align with the Wylfa Newydd Masterplan Materials Management Plan [RD7] and the contractor-derived MMP which is to be produced using the CL:AIRE template and in line with the DoWCoP ensuring:
- an adequate MMP is in place, covering the use of materials on a specific site;
  - the MMP is based on an appropriate risk assessment, that underpins the Remedial Strategy and Implementation Plan and concludes that the objectives of preventing harm to human health and pollution of the environment will be met if materials are used in the proposed manner; and

- that materials are actually treated and used as set out in the MMP and that this is subsequently demonstrated in a Verification Report.
- 2.16 A contractor-appointed QP who is independent to the project will need to review and accept the relevant documents to ensure the suitability and eventual certainty of use of materials.

### **Stockpile Management**

- 2.17 Material stockpiled on site for appropriate reuse will be subject to verification testing as detailed in Section 3 and the MMP with requirements as listed below:
- stockpiles shall be stored in secure designated areas;
  - topsoil stockpiles must be no more than 2m high;
  - all stockpiles shall have a gradient of no more than 1 in 2, unless otherwise agreed by Horizon and demonstrated to be stable;
  - stockpiles shall be managed so that water infiltration is minimised;
  - all stockpiled materials shall be clearly labelled;
  - all stockpiled materials must be tracked, identified on a drawing and managed in accordance with the MMP;
  - made ground materials and potentially contaminated materials etc. shall be stockpiled separately from natural materials to prevent cross contamination;
  - stockpiles considered to be contaminated shall be stored on an impermeable base and have suitable containment and drainage etc. to prevent potentially contaminated waters and sediments escaping;
  - stockpiles containing asbestos and ACM must be stored in the appropriate quarantine areas, avoid the need for double-handling and should be suitably managed to prevent mobilisation of fibres;
  - the location of all material containing asbestos will be recorded in the site safety, health and environment file;
  - chemical testing of stockpiles will be undertaken as required and compared to relevant target values prior to reuse;
  - materials such as plastic, wires, cables, bricks etc. should be removed as far as is reasonably practicable prior to stockpiling; and
  - stockpiles due for disposal shall be stored in a clear location as per MMP and SWMP and sampled in accordance with waste guidance criteria.

### **Suitability for Reuse**

- 2.18 Materials reused for backfilling of excavations or forming the screening bunds shall be managed under the MMP and be subject to verification testing to ensure suitability for final end use as outlined in Section 3.

### **Asbestos and ACM**

- 2.19 Where materials are heavily impacted by asbestos (>0.1% mass asbestos), excavation followed by temporary stockpiling could lead to uncontrolled fibre release. It is therefore proposed that double handling is avoided for such high risk materials by placing directly

into lined containers immediately following excavation to be sent directly to landfill (subject to relevant testing and acceptance). Methodology would require acceptance form relevant stakeholders through Horizon.

## Waste Disposal

- 2.20 Waste shall be managed in accordance with the SWMP [RD8] prior to transfer (non-hazardous) or consignment (hazardous) off-site. All waste shall be consigned to a suitably licensed waste treatment or disposal facility, approved by Horizon. There must be agreement with Horizon with regards to the volume of materials for disposal; further segregation may be required in order to reduce the volume proposed for disposal. If the waste is to be disposed of to landfill, the assessment should include Waste Acceptance Criteria (WAC) testing to determine the category of landfill the material is suitable for.
- 2.21 The EWC should be consulted to ensure all waste disposed of off-site has been categorised correctly. Relevant consignment and waste transfer notes shall be obtained by the Contractor and provided to Horizon.

## Record Keeping

- 2.22 All records pertaining to made ground and land contamination and associated works, including but not limited to, RAMS, laboratory certificates, reports, waste transfer and consignment notes, shall be retained on site by the Contractor throughout the duration of the works and be provided to Horizon on at the end of the project as part of the close out; information should also be available on request.
- 2.23 Horizon records will be contained in the land quality file as designated in the Land Quality Strategy [RD13] and will be managed by the Land Quality Manager.

# 3 Verification

## Sampling

- 3.1 Verification sampling of the excavated materials and materials left in-situ shall be undertaken for suitability for reuse. The derivation of best available technology (BAT) sampling methodologies, sourcing a United Kingdom Accreditation Service (UKAS) accredited laboratory and deriving relevant analysis suites will be required to the satisfaction of relevant regulatory stakeholders. Details shall be presented for acceptance by regulatory stakeholders through Horizon.
- 3.2 Previous GI data shall be consulted from listed reports (Appendix B). In the event that GI data are not available or are insufficient for determining material reuse, then the testing frequencies outlined below shall be used. For instances where sample frequencies are not provided, the Contractor shall propose these to Horizon for acceptance.

## Made Ground

- 3.3 Excavated made ground stockpiles should be tested at the following frequencies:
- Type 1 Made Ground - 1 no. sample per 250m<sup>3</sup>;
  - Type 2 Made Ground - 1 no. sample per 500m<sup>3</sup>; and
  - Type 3 or 4 Made Ground - 1 no. sample per 1000m<sup>3</sup>.

- 3.4 In the event that the assessment criteria are not met, stockpile segregation and further sampling at a higher frequency may be undertaken in order to increase the quantity of materials suitable for reuse on site. An analysis suite must be derived based on previous GI data and accepted by Horizon.

**Note:**

**Made ground containing suspected asbestos or ACM will be tested at a greater frequency than specified above.**

### **Asbestos and ACM**

- 3.5 Further delineation of areas around the peripheral of asbestos and ACM hotspots previously delineated is required and sampling should be undertaken in-situ at a frequency of approximately 100m<sup>3</sup> i.e. a 20x20m<sup>2</sup> grid for the proposed topsoil removal depth of approximately 0.275m.
- 3.6 Excavated materials containing or suspected to contain asbestos or ACM should have initially been segregated based on previous GI data and visual evidence and should be tested at a minimum frequency of:
- 1 no. sample per 100m<sup>3</sup>.
- 3.7 If required, this frequency will be increased in order to provide confidence to Horizon that no materials containing >0.1% asbestos fibres by mass will remain on site as detailed in paragraph 3.17 to 3.20 below.
- 3.8 There must however, be no unnecessary stockpile segregation or disturbance during sampling in order to ensure there is no potential release of fibres.

### **Materials Affected by Contamination**

- 3.9 Materials affected by contamination, or suspected to be affected by contamination will initially have been segregated based on characterisation and on visual and olfactory evidence. An analysis suite and sampling frequency must be derived based on previous GI data and accepted by Horizon. In the event that the encountered contaminated materials are unexpected, procedures set out within the Unexpected Contamination Plan should be adopted.

### **Materials Remaining In-situ**

- 3.10 All bases and walls of excavated areas shall be tested at the following frequency, unless there is sufficient previous GI data to give confidence that this material is suitable for use:
- Base – 1 no. composite sample per 10m by 10m grid centre; and
  - Walls – 1 no. composite sample per 10 linear metres with a minimum of 1 sample per wall.
- 3.11 The analysis suite should be derived based on previous GI data and materials excavated and accepted by Horizon.

### **Waste for Off-site Disposal**

- 3.12 Waste for off-site disposal to landfill must be sampled to meet specific Waste Acceptance Criteria (WAC) and properly categorised prior to disposal at a landfill in accordance with the relevant guidance.

## Assessment Criteria

- 3.13 In order to determine feasible remediation options the broad remedial objectives must be set; these are outlined below:
- Materials remaining in-situ are to be suitable for end use:
    - commercial / industrial end use in the Power Station Site area;
    - public open space / agricultural end use in the agricultural / landscape mound areas.
  - Materials excavated and reused elsewhere on site are to be suitable for end use:
    - commercial / industrial end use in the Power Station Site area;
    - public open space / agricultural end use in the agricultural / landscape mound areas.
  - Materials beneath the site (either remaining in-situ or excavated and reused) must be demonstrated by the Contractor to pose no unacceptable risk to identified controlled waters receptors.
  - Groundwater beneath the site (and migrating onto site) must be demonstrated by the Contractor to pose no unacceptable risk to identified human health or controlled waters receptors; and
  - Environmental Quality Standards (EQS) (freshwater), protective of the most sensitive receptor (Tre'r Gof SSSI) for soil derived leachate.
- 3.14 The results of laboratory analysis should be assessed against the 'suitable for use' criteria defined above;
- if the analytical results indicate that the material is suitable for use, then it can be used as proposed within the MMP or stockpiled for later use;
  - if the laboratory analysis indicates that the material may not be suitable for its proposed use, then this should be recorded within the MMP and Verification Report; and
  - if the laboratory analysis indicates that the material is unsuitable for use on- or off- site, then it should be destined for off-site disposal and a record of these activities retained for inclusion in the Verification Report.

## Land Contamination

- 3.15 Recommended Generic Assessment Criteria (GAC) (derived from Category 4 Screening Levels (C4SLs) and Suitable 4 Use Levels (S4ULs)) and EQSs are to be adopted.
- 3.16 In the event that GACs are not available, relevant target levels will need to be derived based on the information provided in this procedure and in the referenced reports to ensure materials are suitable for use. It is noted that the suitable for use criteria for controlled waters (freshwater EQS) are conservative with regards to soil-derived leachate values. The Contractor may therefore wish to derive site-specific criteria as part of the Remedial Strategy and Implementation Plan; these criteria will require regulatory acceptance prior to use on site.

## Asbestos and ACM

- 3.17 The proposed validation criteria for excavated areas and materials left in-situ are provided on the basis of the CAR work categories, and suitability for use as provided below:

**Table 3.1 CAR Work Categories**  
(based on JIWG beta risk scoring algorithm) [RD5]

Work Category	Criteria
CAR not applicable	Trace levels of fibres in soil – <0.001% wt/wt and no visible ACM fragments.
Non-licensed work	Dispersed fibre concentration in soil >0.001% wt/wt and sporadic visible fragments of ACM in non-original form.
Notifiable non-licensed work	Dispersed fibre concentration in soil >0.01% wt/wt and moderate visible degraded ACM fragments in non-original form.
Licensed work	Asbestos visibly present as clearly identifiable Coatings, Insulation or AIB (not applicable to sampling work).

- 3.18 The criteria for suitability for use are presented below:

**Table 3.2 Asbestos Suitable for Use Criteria**

\*In line with MMP \*\*Horizon have set the criteria at < 0.1%wt/wt.

Suitable for Use Scenario	Criteria
Any use (i.e. unrestricted use)*	Dispersed free fibres in soil <0.001% wt/wt and no visible ACM fragments.
At surface in undisturbed landscaped areas or at near surface in areas liable to disturbance	Dispersed free fibres in soil <0.01% wt/wt chrysotile, <0.001% wt/wt amphibole. <0.1% wt/wt bound chrysotile asbestos. No visible ACM fragments.
At depth with no foreseeable uncontrolled disturbance	No quantitative criteria required. Optional criteria - 0.1%wt/wt**.

\*In line with MMP

\*\*Horizon have set the criteria at < 0.1%wt/wt

- 3.19 The following asbestos removal and remediation criteria will be in place during the works:

Category	Description	Asbestos Removal/Remediation Criteria
Category 1	>0.1% mass asbestos (hazardous waste threshold)	Disposed of as hazardous waste at a licensed facility.
Category 2	>0.01% up to 0.1% mass chrysotile asbestos	Excavated and reused on-site beneath the capping layer of a landscaped bund in the WNDA, subject to maintenance of tracking records to confirm source and destination and any other requirements of a Materials Management Plan.

Category	Description	Asbestos Removal/Remediation Criteria
		<p>OR</p> <p>Disposed of as non-hazardous waste at a licensed facility.</p> <p>OR</p> <p>Disposed of as hazardous waste at a licensed facility if there are visibly identifiable fragments of ACM in the soil (nominally described as fragments larger than a five pence piece) which would trigger disposal as hazardous waste.</p> <p><b>Note:</b></p> <p><b>There will be provision to pick and remove visible fragments and subsequently re-test in order to re-categorise the material, subject to regulatory approval through Horizon.</b></p>
Category 3	>0.001% to 0.01% mass chrysotile	<p>If absent of visible ACM fragments, excavated and reused on-site beneath the capping layer of a landscaped bund in the Wnda, subject to maintenance of tracking records to confirm source and destination and any other requirements of the MMP.</p> <p>OR</p> <p>Disposed of as hazardous waste at a licensed facility if there are visibly identifiable fragments of ACM in the soil as per Category 2 above.</p>
Category 4	<0.001% mass asbestos (chrysotile and amphibole)	<p>If absent of visible ACM fragments, reuse across the Wnda, subject to maintenance of tracking records to confirm source and destination and any other requirements of the MMP.</p>

- 3.20 This threshold criteria will be included in the Remedial Strategy and Implementation Plan with justification for use; this will be submitted to NRW for acceptance. It shall also be adopted within the MMP in line with the CL:AIRE Code of Practice.

## Materials Affected by Unexpected Contamination

- 3.21 No assessment criteria have been proposed for any land contamination. Should further unexpected contamination be encountered during the works the scale of further investigation / sampling / risk assessment should be determined on a case by case basis to be suitable for the unexpected contamination encountered.
- 3.22 This shall be provided within the Unexpected Contamination Plan and shall allow derived thresholds for suitability for reuse.

## Waste for Off-site Disposal / Recycling

- 3.23 In the event that materials have been deemed as waste and therefore unsuitable for use either through visual / olfactory evidence or through laboratory analysis, these shall be subjected to WAC testing and waste classification and shall adhere to the SWMP.

## 4 Verification Report

- 4.1 There is a requirement to produce a Verification Report detailing that the works have been completed in accordance with the agreed Remedial Strategy and Implementation Plan. The Verification Report shall comply with the information requirements specified within the agreed Verification Plan and be in accordance with CL:AIRE best practice guidance; Horizon will provide a Verification Report template as agreed with CL:AIRE and consistent with other Wylfa Newydd project deliverables. The Verification Report shall clearly state the objectives of the work, its limitations, a summary of the remediation undertaken on site and any variations that occurred to the original strategy, and why these occurred.
- 4.2 The Verification Report shall be prepared by the Contractor as agreed with Horizon. Horizon shall submit the report to provide evidence that the remediation works have been successfully completed on site.

## 5 References

**Table 5.1 References**

Ref. No.	Document Number	Title	Author and Date
RD1	HG-S-07-PSD-02-370	Conventional Materials & Waste	Horizon, 2016
RD2	HG-S-07-PRC-03-1224	Management of Materials and Waste Procedure	Horizon, 2016
RD3	HG-S-07-F-04-600	Waste Management Checklist	Horizon, 2016
RD4	WN02.04.01-JAC-OS-REP-00041	Wylfa Site Preparation and Clearance, Land Contamination Risk Assessment and Remediation Strategy.	Jacobs, 2016
RD5	60483167/MARP001	Site Preparation and Clearance: Task A: Technical Memorandum – Management of Asbestos Impacted Soils	AECOM, 2016
RD6	WN012-S4-OS-SPE-00003	SPC Works Information. Part 1: Procurement Specification Summary	Horizon, 2016
RD7	HNP-S3-EWM-SPE-00006	Wylfa Newydd Masterplan Materials Management Plan	Horizon, 2016

Ref. No.	Document Number	Title	Author and Date
RD8	HNP-S3-EWM-AUD-00001	Wylfa Newydd Site Waste Management Plan	Horizon, 2016
RD9	HNP-S3-EWM-PLN-00002	Environmental Management Plan	Horizon, 2016
RD10	HG-S-07-PRC-03-1348	Management of Ecology	Horizon, TBA
RD11	HNP-S3-EWM-NOT-00001	Sites Radiological Local Rules and Contingency Arrangements	Horizon, 2016
RD12	60PO8028/MMCL/R/005	Site Preparation and Clearance. Preliminary Soil Management Strategy. Rev 4.0	Jacobs, 2016
RD13	HNP-FNC-EWM-STR-00002	Land Quality Strategy	Horizon, 2016

## Appendix A: Relevant Pollutant Linkages

A.1 Sources of the primary contamination encountered within each APC and identification of other potential sources of contamination which have been identified across the WNDAs and other sites are detailed in Jacobs report [RD4] and listed below:

Area	Identified Point Source	General Source
APC7	Trichloroethylene (TCE) sump \ valve chamber area Hydrocarbon contamination at OT613 and PC7TP08. Asbestos and ACM.	Made Ground across remainder of APCs.
APC9	Hydrocarbons in groundwater at SMBH14 and BH858.	Made Ground across remainder of APCs.
APC10, ACP12, APC19	Localised asbestos contamination (refer to Figure 8 for locations of positive asbestos results). Potential for lead shot within APC19 (clay pigeon shooting).	Made Ground across remainder of APCs.
APC11, APC15, APC18	N/A	Made Ground across APCs.
APC17	Area of waste material at surface, including asbestos.	N/A
APC16	Potential hydrocarbons contamination migrating on-site.	N/A
South of APC 7	Linear Alkyl benzene, recent spill, south of APC7.	SPEN cable – to be remediated by SPEN prior to works.
Existing Power Station	N/A	Contamination resulting from operation of power station e.g. lubricating oils.
Groundwater across WNDAs	Widespread exceedances of metals (notably manganese) and other inorganics (notably nitrate and ammoniacal nitrogen).	These exceedances are attributed, partially at least, to naturally high background concentrations and agricultural activities within the area. There are also sporadic exceedances of hydrocarbons and other contaminants although no gross contamination has been recorded.
Remainder of Site	Sheep dips, cess pits etc. associated with former agricultural activities. Wells and basements / foundations of previously demolished and to be demolished dwellings.	N/A

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Management of Made Ground and Land Contamination Procedure

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Area	Identified Point Source	General Source
Remainder of Site	Unknown/unexpected	Unknown/unexpected

## Appendix B: Ground Investigation Reports

Title	Ground Investigation Company	Date
Wylfa 'B' Ground Investigation	Wimpey Laboratories	1987
Onshore investigation for a proposed combined cycle power station.	Soil Mechanics	1997 –1998
Wylfa Newydd Preliminary Site Investigation (PSI)	Structural Soils Limited	2009 – 2010
PSI Interpretative Report	Halcrow Limited	2010
Investigation of Chlorinated Solvent Contamination of Water in Sump Adjacent to Wylfa Site	Enviros Ltd	2009
Wylfa Newydd Intermediate Onshore Ground Investigation (IOnGI)	Structural Soils Limited	2010 –2011
Wylfa Newydd Intermediate Offshore Ground Investigation (IOffGI)	Fugro Seacore Limited	2011
IOnGI Geotechnical Interpretative Report	Halcrow Limited	2012
Contaminated Land Desk Study and Initial Risk Assessment Report	Halcrow Limited	2012
Wylfa Newydd Nuclear Power Station Detailed Onshore Ground Investigation (DOnGI)	Structural Soils Limited	2014 –2015
DOnGI Interpretative Ground Investigation Report	Atkins	2015
Draft Factual Report 2015 Ground Investigation	Structural Soils Limited	2015

## Appendix C: Made Ground Characterisation

- C.1 Excavated made ground identified within the APCs shall be segregated as per the type identified below (see Jacobs report [RD4] for more details) and by visual and olfactory and previous GI evidence with regards to contamination.

Type	Unit	Typical Description
1	Waste material	Dark brown mottled dark grey sandy gravel with cobbles, containing a mixture of metal, wire, plastic sheeting, fibreglass, whole bricks, asphalt, slag, old oil filters, ash, plastic pipe, plastic tape, glass, wood, masonry, corrugated board / metal and possible asbestos board / cement.
2	Re-worked natural ground intermixed with Made Ground / waste	Brown clayey sandy gravel with medium cobble and boulder content, containing inclusions of anthropogenic waste material.
3	Re-worked natural / possible Made Ground	Brown to dark brown or grey slightly clayey sandy gravel with rare quantities (i.e. <1% of material) of brick or ceramics.
4	Topsoil	Brown, firm, friable, gravelly, sandy clay with abundant rootlets and occasional anthropogenic material.



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