NNB Generation Company Ltd Company Document

Hinkley Point C Power Station Decommissioning and Waste Management Plan Revision 4.0

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APPROVAL SIGN-OFF:

HINKLEY POINT C POWER STATION DECOMMISSIONING AND WASTE MANAGEMENT PLAN REVISION 4.0.

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DOCUMENT CONTROL

Version	Purpose	Amendment	By	Date
1.0	Issue	First Formal Issue	G Owen	29/2/12
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EXECUTIVE SUMMARY

Legal Background

Under section 45 of the Energy Act 2008 (the Act) (Ref. 1), a person who applies for a nuclear site licence to install or operate a nuclear power station must notify the Secretary of State of the application and prepare and submit a Funded Decommissioning Programme for approval.

The Government has published Guidance on what an approvable Funded Decommissioning Programme should contain (hereafter referred to as "the FDP Guidance"). The FDP Guidance makes clear that the Funded Decommissioning Programme should consist of two parts. The first part, referred to as the Decommissioning and Waste Management Plan, will fulfil the operator's obligation under section 45(7) of the Energy Act 2008 to set out:

- details of the steps to be taken in relation to the technical matters; and
- estimates of costs likely to be incurred in connection with the Designated Technical Matters.

The second part, referred to as the Funding Arrangements Plan (Ref. 3) will assist operators in setting out acceptable financing proposals to meet the costs identified in the Decommissioning and Waste Management Plan.

Purpose and Scope of the DWMP

This document is the Decommissioning and Waste Management Plan for NNB Generation Company Limited's proposed Hinkley Point C Nuclear Power Station. It is a summary level document, which sets out the steps that will be taken to decommission Hinkley Point C at the end of its operational life, and provides an estimate of the costs of decommissioning and waste management which constitute the technical matters.

The Decommissioning and Waste Management Plan has been prepared to meet the Guiding Factors set out in the FDP Guidance. The DWMP, supported by the Detailed Decommissioning and Waste Management Plan, demonstrates that NNB GenCo's plans for the decommissioning of the site and for the management and disposal of waste arisings are realistic, clearly defined and achievable. The steps that are proposed for the decommissioning of Hinkley Point C are realistic, clearly defined and achievable and capable of being undertaken in a way which is consistent with the requirements and expectations of the relevant safety, security and environmental regulators. Major project risks have been identified and due account of risk and uncertainty has been taken. Any technology or other gaps in the plans have been identified.

The Funding Arrangements Plan sets out effective mechanisms for ensuring that the cost estimates for the Designated Technical Matters are robust; are kept up to date; and are consistent with the state of knowledge and technology at the time of calculation.

The scope of this decommissioning plan and the associated costs covers all work relating to the decommissioning of the site and the management and disposal of all hazardous wastes. It commences with pre-closure preparatory work five years prior to End of Generation (EoG[1]) of Unit 1, and continues until all plant, facilities and buildings have been decommissioned and all wastes, including spent fuel, removed and disposed of.

The end point for the decommissioning of Hinkley Point C is when all buildings and facilities have been removed and the site has been returned to the end state similar to a green field site, as agreed with the regulators and the planning authority.

The Base and P80 cost estimate for the full scope of work, classified as Designated Technical Matters, is presented in Section 6.1.

The Estimated Cost for the Decommissioning and Waste Management at HPC is given in the Section 6 Table 2. This table sets out the current estimate which was prepared at a detailed level and presented in Table 6, plus any subsequent changes which have been identified immediately prior to issue of this DWMP. Any identified changes have been "change controlled" into the "Live" HPC schedule and cost estimate to accurately reflect the basis of the HPC cost estimate.

The FDP Guidance states that operators should assume that ILW from operations and decommissioning will be stored in safe and secure interim storage facilities on the site of the power station pending disposal; and that Spent fuel will be stored in cooling ponds for a period of time, followed by storage in safe and secure interim stores on the site of the power station until decommissioning has been completed and disposal facilities are available to accommodate it. Title to the waste will transfer to Government along with the payment of a Waste Transfer Fee to meet the costs of waste management and disposal. The Decommissioning and Waste Management Plan provides an estimate of these post decommissioning waste management costs with the waste transfer price provided by Government under the Waste Transfer Contract (WTC).

Under the Waste Transfer Contract the HPC waste, including spent fuel, will transfer to Government along with the payment of a Waste Transfer Fee to meet the costs of waste management and disposal. The expected timing for this will be set out in the WTC, but it is currently expected that title to ILW will transfer on disposal to the GDF during the decommissioning period, whilst spent fuel will transfer at the end of the decommissioning period. The input data required by the Waste Transfer Contract and Funding Arrangements Plan (FAP) is presented in Section 6.2 and a summary cash flow has been provided as appendix A-1 of this DWMP.

Structure of the DWMP

The DWMP is supported by a Detailed Decommissioning and Waste Management Plan (Ref. 9) which provides further detail on the scope of the decommissioning steps, and includes a detailed schedule setting out the timing and interdependencies of the proposed works. The Detailed Decommissioning and Waste Management Plan also provides further detail on the costs of decommissioning and the methods by

[1] End of Generation (EoG) is the event when the nuclear reactor is permanently shutdown and electricity generation on the associated generating plant for the unit ends.

which they have been estimated. The DDWMP will be reviewed, maintained, developed and verified alongside the DWMP in accordance with arrangements set out in the FAP. Further detail is included in the Chapter 3 of the DDWMP.

The two documents have a common EPR Work Breakdown Structure (EPRWBS). This provides direct linkage between the scope statements (which describe the work that will be done) the schedule (which indicates when the work will be done) and the associated cost. The EPRWBS also ensures that the linkage between the Decommissioning and Waste Management Plan and the supporting Detailed Decommissioning and Waste Management Plan is transparent. This provides a "golden thread" between the summary level costs in the Decommissioning and Waste Management Plan and the detailed costs and underpinning technical basis for the estimation contained within the Detailed Decommissioning and Waste Management Plan. Cross referencing to more detailed material in the text of the Detailed Decommissioning and Waste Management Plan has been included where relevant.

Technical Matters and Designated Technical Matters

The Energy Act 2008 distinguishes between technical matters (where the operator must set out the steps to be taken) and the Designated Technical Matters (where the operator must also make estimates of the costs).

The technical matters are the steps set out in the DWMP relating to the decommissioning of the power station, cleaning up of the site, and waste management and disposal activities.

The key difference between the technical matters and the Designated Technical Matters is that the cost of Non-Designated Technical Matters will be met by NNB GenCo from operational revenue, while the costs of Designated Technical Matters must be provided for in the Funded Decommissioning Programme.

The costs of technical matters are not subject to the terms of the Funding Arrangements Plan. However the Decommissioning and Waste Management Plan describes the steps to be taken in relation to the technical matters to demonstrate that it has realistic, clearly defined and achievable plans.

Future Development of the Decommissioning and Waste Management Plan

This plan has been prepared at a very early stage in the development of Hinkley Point C. The scope of works has been prepared against the currently available knowledge of the state of plant at the time of preparation. Both the Decommissioning and Waste Management Plan and the underpinning Detailed Decommissioning and Waste Management Plan will develop and change over time to reflect modifications to the plant and to decommissioning best practice. The arrangements and legal obligations for the periodic review and updating of the Decommissioning and Waste Management Plan and its associated costs are set out in the Funding Arrangements Plan. The Decommissioning and Waste Management Plan does not in itself confer any legal rights or impose any legal obligations on either NNB GenCo or the Nuclear Decommissioning Fund Company Limited beyond those set out in the Funding Arrangements Plan.

Summary

The Decommissioning and Waste Management Plan is presented at a level which gives sufficient detail to provide an understanding of the scope of work included in the cost estimate.

The decommissioning and waste management processes described employ currently available technology throughout. This approach aligns with the "Base Case" assumptions set out in The FDP Guidance and with regulatory expectation.

The DWMP focuses on the description of the work to be undertaken as the basis for the cost estimates. It includes:

- A description of the HPC site (Section 2).
- A summary of the process of decommissioning the site, and the management of the hazardous wastes produced during operation and decommissioning (Section 3).
- A description of the scope of the technical matters and the Designated Technical Matters against a work breakdown structure (Section 4)
- A summary schedule of works against the EPR work breakdown structure (Section 5)
- A summary of the costs against the EPR work breakdown structure (Section 6).

In line with the FDP Guidance the DWMP also includes:

- A summary of the key assumptions and exclusions underpinning the DWMP (Section 7).
- A summary of the cost estimates in an alternative cost structure in line with that provided in the FDP Guidance (Section 6).
- An explanation of the derivation of the cost estimates including an analysis of the level and sources of estimating uncertainty and risk in those estimates (Section 8).
- An explanation as to how the assumptions and parameters underpinning the DWMP are expected to evolve over time as the new nuclear power station operates and draws near to closure are set out in the FAP, and further detailed in the DDWMP Chapter 3.

CONTENTS

1 INTRODUCTION, PURPOSE AND ARRANGEMENT OF THE DWMP DOCUMENTATION

1.1 BACKGROUND TO THE DWMP

Under section 45 of the Energy Act 2008 (the Act), a person who applies for a nuclear site licence to install or operate a nuclear power station must notify the Secretary of State of the application and prepare and submit a Funded Decommissioning Plan (FDP) for approval. It is an offence under section 47 of the Act to use the site, by virtue of the licence without an approved FDP in place.

The Government has published Guidance on what an approvable FDP should contain. The FDP Guidance makes clear the expectation that the FDP should consist of two parts. The first part, referred to as the Decommissioning and Waste Management Plan (DWMP) will fulfil the operator's obligation under section 45(7) of the Energy Act 2008 to set out:

- details of the steps to be taken in relation to the technical matters; and
- estimates of costs likely to be incurred in connection with the Designated Technical Matters.

The second part, referred to as the Funding Arrangements Plan (FAP) will assist operators in setting out acceptable financing proposals to meet the costs identified in the DWMP.

This document is the DWMP for NNB Generation Company Limited's (NNB GenCo) proposed Hinkley Point C Nuclear Power Station (HPC). It is a summary level document, which sets out the steps that will be taken to decommission HPC at the end of its operational life, and provides an estimate of the costs of decommissioning and waste management which constitute Designated Technical Matters under the Energy Act 2008 and associated regulations.

The DWMP has been prepared to meet the Guiding Factors set out in the FDP Guidance. The DWMP, supported by the Detailed Decommissioning and Waste Management Plan, demonstrates that NNB GenCo's plans for the decommissioning of the site and for the management and disposal of waste arisings are realistic, clearly defined and achievable. The steps that are proposed for the decommissioning of Hinkley Point C are realistic, clearly defined and achievable and capable of being undertaken in a way which is consistent with the requirements and expectations of the relevant safety, security and environmental regulators. Major project risks have been identified and due account of risk and uncertainty has been taken. Any technology or other gaps in the plans have been identified.

The scope of this decommissioning plan and the associated costs covers all work relating to the decommissioning of the site and the management and disposal of all hazardous wastes. It commences with pre-closure preparatory work five years prior to End of Generation (EoG) of Unit 1, and continues until all plant, facilities and buildings have been decommissioned and all wastes, including spent fuel, removed and disposed of. The end point for the decommissioning of Hinkley Point C is when all buildings and facilities have been removed and the site has been returned to the end state similar to a green field site, as agreed with the regulators and the planning authority.

The overall programme of work includes the following activities:

- Pre-closure planning;
- Management and operation of the shut-down site during decommissioning;
- Spent fuel management after EoG, including interim storage, processing, transport and disposal;
- Management of operational wastes after EoG, including interim storage, processing, transport and disposal;
- Decommissioning of all plant, equipment, buildings and facilities and the management, processing, transport and disposal of the radioactive and other hazardous wastes arising, and
- Remediation and delicensing, and return of the site to an agreed end state, similar to green field.

The full scope also includes overarching costs during the decommissioning period, such as NNB GenCo corporate support, the operating costs of the Nuclear Decommissioning Fund Company Limited (FDP Co) and costs incurred by DECC in the relation to the FDP and as set out in the Nuclear Decommissioning and Waste handling (Finance and Fees) regulations.

This DWMP programme of work covers both the technical matters and the Designated Technical Matters.

The technical matters are the steps set out in the DWMP relating to the decommissioning of the power station, cleaning up of the site, and waste management and disposal activities.

Many of the technical matters are also Designated Technical Matters. These are:

- The steps that need to be taken to decommission the installation and clean up the site (which includes the management and disposal of waste) after EoG;
- Certain steps undertaken before EoG designated by the Nuclear Decommissioning and Waste Handling (Designated Technical Matters) Order 2010 (the Order) (Ref. 4) being;
- Any activity preparatory to the decommissioning of a relevant nuclear installation and the cleaning up of the site.

The key difference between the technical matters and the Designated Technical Matters is that the cost of Non-Designated Technical Matters will be met by NNB GenCo from operational revenue, while the costs of Designated Technical Matters must be provided for in the FDP.

The costs of Non-Designated Technical Matters are not subject to the terms of the FAP, however, in response to the FDP Guidance, the DWMP describes the steps to be taken in relation to the technical matters to demonstrate that it has realistic, clearly defined and achievable plans. Payments for costs of Non-Designated Technical Matters will be made at the time these expenses are incurred, i.e. during the generating life of the station, without reference to the Fund.

1.2 CONTENTS OF THE DWMP

The DWMP is presented in sufficient detail to provide an understanding of the scope of work included in the cost estimate. The decommissioning and waste management processes described employ currently available technology throughout. This approach aligns with the "Base Case" assumptions set out in the FDP Guidance and with regulatory expectation. The scope of works have been prepared against the currently available knowledge of the design of plant at the time of preparing this DWMP.

The DWMP focuses on the description of the work to be undertaken as the basis for the cost estimates. It includes:

- A description of the HPC site (Section 2);
- The process of decommissioning the site, and the management of the hazardous wastes produced during operation and decommissioning (Section 3);
- A description of the scope of the technical matters and the Designated Technical Matters against a work breakdown structure (Section 4);
- A table showing a summary schedule of works and costs against the work breakdown structure (Section 5).

In line with the FDP Guidance the DWMP also includes:

- A summary of the key assumptions and exclusions underpinning the DWMP (Section 7);
- A summary of the cost estimates in a cost structure which is in line with that provided in the FDP Guidance (Section 6);
- An explanation of the derivation of the cost estimates including an analysis of the level and sources of risk and uncertainty in those estimates (Section 8);
- An explanation as to how the assumptions and parameters underpinning the DWMP are expected to evolve over time as the nuclear power station operates and draws near to closure is set out in the FAP and further detailed in Chapter 3 of the DDWMP.

1.3 DECOMMISSIONING AND WASTE MANAGEMENT COST ESTIMATES AND FEE PAYABLE TO GOVERNMENT AT TITLE TRANSFER

The Base and P80[2] cost estimate for the full scope of work, classified as Designated Technical Matters, is presented in Section 6.1.

[2] The P80 value produced by this exercise is called the "derived P80 value". It does not represent a statistical P80 value, but NNB considers that it provides a robust and conservative estimate for this stage of the development of HPC. The derived P80 value will be replaced with a statistical P80 value for the As–Built version of the DWMP and for future quinquennial reviews. (Refer to Section 8.2.3.1)

The FDP Guidance states that operators should assume that ILW from operations and decommissioning will be stored in safe and secure interim storage facilities on the site of the power station pending disposal; and that Spent fuel will be stored in cooling ponds for a period of time, followed by storage in safe and secure interim stores on the site of the power station until decommissioning has been completed and disposal facilities are available to accommodate it. Title to the waste will transfer to Government along with the payment of a Waste Transfer Fee to meet the costs of waste management and disposal. The Decommissioning and Waste Management Plan provides an estimate of the post-decommissioning waste management costs and also provides an estimate of the costs of waste disposal, based on the waste transfer price provided by Government under the Waste Transfer Contract (WTC). The calculation of the Waste Transfer Fee is set out in the Waste Transfer Contract between Government and NNB GenCo.

Under the WTC title to the HPC waste, including spent fuel, will transfer to Government along with the payment of a Waste Transfer Fee to meet the costs of waste management and disposal. The expected timing for this will be set out in the WTC. It is currently expected that title to ILW will transfer on delivery to the GDF during the decommissioning period, subject to the availability of the GDF at that time, and that title to and liability for spent fuel will transfer to Government at the end of the decommissioning period, pending disposal in the GDF at a later, specified Assumed Disposal Date. The input data required by the Waste Transfer Contract and Funding Arrangements Plan (FAP) is presented in Section 6.2 and a summary cash flow has been provided as appendix A-1 of this DWMP.

1.4 STRUCTURE OF THE DWMP

As set out above, this Decommissioning and Waste Management Plan (DWMP)

- forms part of the Funded Decommissioning Programme (FDP) for Hinkley Point C Power Station; and
- is a summary level plan supported by and closely linked to a Detailed Decommissioning and Waste Management Plan (DDWMP).

In turn, the DDWMP;

- includes a detailed schedule and cost estimate; and
- is supported by a large number of reference reports and cost estimates.

The structure and relationship between the component parts of the DWMP are set out in Figure 1.

The DWMP presents the strategy and plan for the site at a high level, setting out appropriate details of the steps planned to be taken to decommission the site and carry out spent fuel management, with an accompanying summary level schedule and tables of the cost estimates.

The DDWMP sets out a detailed plan for the decommissioning of HPC, including descriptions of the processes employed and the basis of the cost estimates. It is the main supporting reference for the DWMP. It describes how decommissioning will be undertaken showing the relationship between scope, schedule and costs in sufficient detail, for the establishment of a robust estimate of the cost of decommissioning and waste management (the Designated Technical Matters). The DDWMP also sets out how estimating uncertainty and risk have been addressed. As the main supporting

reference to the DWMP it provides the basis for a detailed, independent review and audit of the associated cost estimates.

The DWMP and DDWMP have been prepared at a very early stage in the development of HPC and will inevitably change over time to reflect changes to the plant and to decommissioning best practice. The arrangements and legal obligations for the periodic review and updating of the DWMP and its associated costs are set out in the FAP. As the DDWMP is the main supporting reference it will be subject to periodic review and updating in line with the arrangements set out in the FAP.

The EPR Work Breakdown Structure (EPRWBS), a coding system for breaking down and presenting the work to be undertaken against a clear and logical structure, provides the skeleton which directly links scope, schedule and cost for the work. This facilitates the direct linkage of the work described at a higher level in the DWMP and more detailed scope, schedule and cost for the work presented in the DDWMP. The EPRWBS facilitates audit of the scope, schedule and cost for any part of the decommissioning and waste management plan.

The EPRWBS provides a logical structure for the planning and execution of the decommissioning and waste management activities. However, the FDP Guidance also proposes that there be clarity on which costs are paid for from the Fund (the Designated Technical Matters), and which would be regarded as operational costs (the technical matters). To provide this transparency, each element of the EPRWBS is cross referenced to an EPR Cost Reporting Structure, which also makes the distinction between Technical Matters and Designated Technical Matters as defined in Section 45 of the Energy Act and associated Regulations. The EPRWBS and EPRCRS are summarised in Section 3.4 and 3.5.

The DDWMP utilises a proprietary scheduling application, Primavera, with an associated database. This has a central role in collecting, compiling, calculating and presenting the decommissioning and waste management cost estimates. All data in Primavera is structured against the EPRWBS, and is in addition coded against the EPR Cost Reporting Structure (EPRCRS). In addition to outputs of base cost estimates, outputs including contingency (estimating uncertainty and risk) and cash flow over the entire duration of the programme can be made.

The cost estimates have been calculated by a range of well understood and standard estimating practices as described in Section 8.1. The technical basis and detailed assumptions for the individual cost calculations are set out within the Primavera database which provides the linkage to the source data or technical report underpinning the estimate. The relationships are set out in Figure 1.

For this version of the DWMP, a hybrid approach has generally been employed to determine the overall contingency (comprising estimating uncertainty and risk) for each decommissioning and waste management task. Where any given cost element has been based upon and extrapolated from an existing estimate for a nuclear power station, the contingency level applied previously to the source cost estimate has been adjusted to reflect the specific circumstances at HPC. The estimating uncertainty may be increased or decreased to reflect the confidence in the cost estimate for HPC, and the probability of a risk occurring and its impact are similarly adjusted from the source data to address the specific circumstances of the HPC project. A full statistical approach to estimating uncertainty and risk will be introduced commencing with the as built DWMP (AB-DWMP).

The reference material includes new EPR and HPC specific studies and reports, spreadsheets, calculations and notes. In addition, relevant and appropriate material, originating from work for the EDF Energy Nuclear Generation fleet has been utilised, particularly from the Baseline Decommissioning Plans for Sizewell B, Hinkley Point B, Hunterston B and Heysham 1. This reference material underwent a full statistical Monte-Carlo analysis to determine the overall contingency level for the estimating uncertainty and risk data.

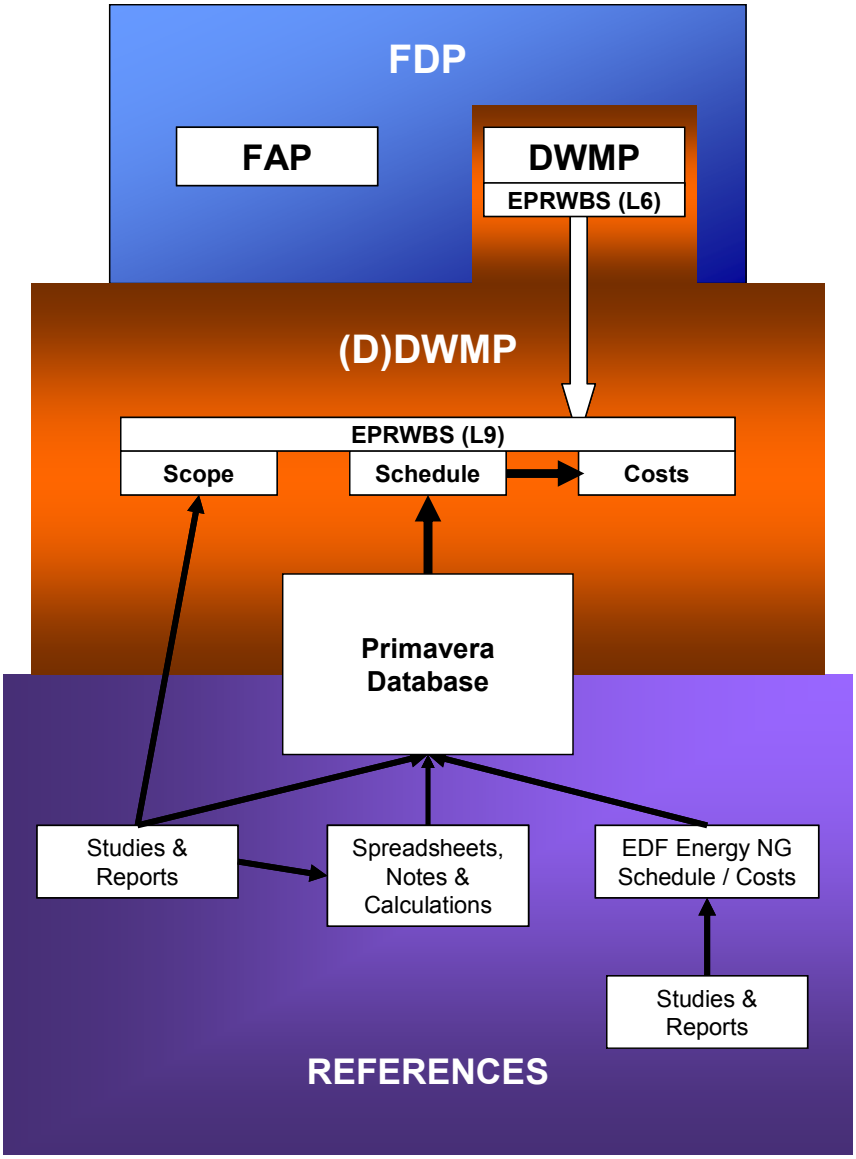

Figure 1: Arrangement of the DWMP Documentation

2 SITE DESCRIPTION

2.1 SITE LOCATION AND ENVIRONS

HPC is located on the West Somerset coast, 25 km to the east of Minehead and 12 km to the north-west of Bridgwater. The site falls within the parish of Stogursey in the district of West Somerset. The HPC nuclear power station operational site covers approximately 66.6 hectares, with cooling water for the station being provided from the Severn Estuary. Immediately to the east of the Site, the land is occupied by two nuclear power stations, Hinkley Point A and Hinkley Point B, which form the existing Hinkley Point Power Station Complex (Figure 2). Hinkley Point A is currently undergoing decommissioning by the Nuclear Decommissioning Authority (NDA). Hinkley Point B, owned by EDF Energy Nuclear Generation (NG), has operated since 1976 and is currently scheduled to continue generating until 2023.

The site is bounded to the north by Bridgwater Bay, part of the Severn Estuary, from which it is separated by a low cliff between 5 and 10m in height. At low tide, the shore adjacent to the site comprises a relatively narrow platform of rock, cobbles and pebbles, interspersed with and fringed by muddy sand.

2.2 DESIGNATED SITES

2.2.1 Nature Conservation Designations

There are a number of designated sites in proximity to the HPC site which have been considered in developing this DWMP. The Severn Estuary to the north is recognised for its international and national nature conservation importance.

2.2.2 Statutory Protected Sites and Landscape Designations

Within the HPC site there are no Scheduled Monuments, Listed Buildings, Conservation Areas, Registered Parks and Gardens or Registered Battlefields. There are also no landscape designations within the site.

2.3 SITE, PRINCIPAL BUILDINGS AND SYSTEMS

The Areva/EDF design EPR, is a Pressurised Water Reactor (PWR), the design of which incorporates technology from French N4 and German KONVOI reactors. Two EPR units are to be constructed on the HPC site of approximately 1650MWe each, cooled through an open system which works broadly in the same way as other PWR's already in operation. The two EPR units are served by their own safety and support systems and a number of common facilities and systems serving both units (Figure 3: Hinkley Point C Power Station Site Plan). For ease of reference, the buildings and systems associated with each unit are divided into a number of areas detailed below:

- The Nuclear Island (NI) – all equipment, systems, instrumentation and control and other relevant hardware installed within the reactor and reactor auxiliary buildings.
- The Conventional Island – all other structures, divided into additional sections later in this document, with the addition of balance of plant, buildings related to fuel and waste management, ancillary buildings etc

2.3.1 Nuclear Island

For each unit, the Reactor Building, Fuel Building and Safeguard Buildings are installed on the same raft which is designed to withstand earthquakes and shockwaves. The shared foundation raft is shaped like a cross, with the Reactor Building at its centre, the Fuel Building and Electrical/Mechanical Safeguard Buildings at its edges.

Facilities comprising the nuclear island include:

- Reactor Building;
- Fuel Building;
- Nuclear Auxiliary Building;
- Safeguard Buildings;
- Access Building;
- Diesel Buildings;
- Radioactive Waste Treatment Building;
- Hot Laundry, Hot Workshop, Hot Warehouse, facilities for decontamination;
- Tanks for the Liquid Radioactive Monitoring and Discharge System, the Additional Liquid Waste Discharge system and the Conventional Island Liquid Waste System.

The Reactor Building, Fuel Building and trains 2 and 3 of the safeguard systems are protected by a substantial external structure designed to withstand an aircraft impact. The internal structure is detached from the external structure to minimise the transmission of shock and vibration.

The Reactor Building houses the Primary Circuit, Steam Generators, Reactor Coolant Pumps, Reactor Pressure Vessel and the Pressuriser. The containment is of a “double enclosure” type with a pre-stressed concrete inner enclosure and a reinforced concrete outer enclosure.

The Fuel Building houses the main spent fuel pool-water cooling systems, the spent fuel pool, fuel assembly loading, storage, inspection and transfer facilities and ventilation and filtration systems. The roof of the Fuel Building supports the stack for discharge of gaseous effluent from the Nuclear Auxiliary Building.

The Nuclear Auxiliary Building houses nuclear operation systems and the maintenance areas, including the treatment systems for effluents from the Primary Circuit, the pool-water treatment system, the gaseous effluent treatment system, part of the steam-generator blow-down treatment and cooling system and building operational ventilation and chilled water systems.

The Safeguard Buildings include mechanical and electrical areas. The mechanical area contains systems dedicated to heat removal and emergency feedwater while the electrical area contains electrical safety, control and instrumentation systems.

The main function of the Access Building/Access Tower is to control access to the Nuclear Island.

There are two Diesel buildings per unit, each housing two emergency diesel generator sets and one Station Black Out diesel generator set for plant cooling.

The Radioactive Waste Treatment building is subdivided into two sections:

- Radioactive Waste Storage Building;
- Radioactive Waste Process Building.

The Radioactive Waste Treatment Building adjoins the Nuclear Auxiliary Building on Unit 1 and is designed to serve both units. One single building encompasses all the facilities for decontamination, the hot workshop and the hot warehouse. This building is located in order to facilitate transportation of material arriving from the other buildings on the Nuclear Island. It also provides changing facilities and radiological protection facilities including health physics monitoring facilities.

The liquid effluent tanks are located adjacent to both the Hot Laundry and the Hot Workshop.

2.3.2 Conventional Island

The conventional island mainly comprises the following structures:

- Turbine Hall;
- Safety Unclassified Electrical building;
- Gas Insulated Switch Gear (GIS);
- Main Transformer (Step-up Transformer);
- Unit Transformer;
- Auxiliary Transformer (Station Transformer)

HPC is a twin reactor site, incorporating a Turbine Hall per Unit. Each Turbine Hall houses a turbo-generator set, moisture separator/re-heaters, a condenser and feed-water plant, and associated support systems.

The Safety Unclassified Electrical Building houses all the unclassified electrical equipment serving the Conventional Island and the other unit structures apart from the Nuclear Island. This building adjoins the Turbine Hall and is near the Power Transmission Platform.

The Power Transmission Platform also adjoins the Turbine Hall. It houses the main transformer and the two step-down transformers. Another platform, adjoining the main transformer platform, houses the auxiliary transformer.

2.3.3 Balance of Plant

The Balance of Plant comprises the following buildings and structures:

- Cooling Water Pumphouse;
- Cooling Water Forebay;
- Cooling Water Intake;
- Cooling Water Outfall;
- Outfall Pond;
- Filtering Debris Recovery Pit;
- Fire Fighting Water building;
- Attenuation Pond;
- Demineralisation/desalination Station;
- Auxiliary Boilers;
- Hydrogen Storage;
- Oxygen Storage;
- Chemical Products Storage.

There are two Cooling Water (CW) Pumphouses, one associated with each Unit. The CW Pumphouse contains equipment supplying CW for the Nuclear and Conventional Islands' auxiliary CW systems and the condenser cooling system that cools the turbine exhaust steam.

There is a forebay for each unit located to the north of each CW Pumphouse. Each is an open basin surrounded by a reinforced concrete wall.

There are separate CW Intake Tunnels for each of the units and a common outfall tunnel. The intake heads are positioned approximately 3.6km offshore and two head structures will be connected to each intake tunnel via vertical shafts. Two outfall heads will be connected to the common outfall tunnel via similar vertical shafts and will be positioned approximately 2km offshore. Each intake tunnel feeds directly into the open Forebay. Two underground tunnels link the Forebays of the two units.

The Outfall Pond is adjacent to the CW Pumphouse. The plant for managing screen debris is positioned next to the CW Pumphouse. It consists of a pre-discharge section and a debris recovery pit. The pre-discharge section involves a series of culverts running from the drum screen and chain ('band') screen area to the debris recovery pit.

The Fire-Fighting Water Building contains the classified system for the supply of fire-fighting water for fire protection of the Nuclear Island. It also stores water for the resupply of the steam generator emergency feedwater supply. There is one building for each Unit, located adjacent to the Outfall Pond.

An Attenuation Pond is provided between the two Service Water Pump Buildings. It incorporates a confinement tank, sedimentation tank and oil filter.

Demineralised water will be processed from raw water delivered via the local water company's mains in the demineralisation/desalination station.

A single Auxiliary Boiler Building is located adjacent to Unit 1.

Oxygen and flammable gas storage is provided and the platform for chemical products is common to both units.

2.3.4 Buildings Related to Spent Fuel and Waste Management

How radioactive waste is managed depends to a large extent on how radioactive it is, and different facilities are often appropriate for each category. The categories of radioactive waste defined in the UK are set out in Appendix 1.

Buildings related to fuel and waste management include the:

- Interim Spent Fuel Store (ISFS);
- Intermediate Level Waste (ILW) Interim Storage Facility (ILWISF);
- Conventional Waste Storage;
- Transit Area for Low Level Waste (LLW) and Very Low Level Waste (VLLW).

The ISFS is located in the north-east corner of the site and will have a large enough capacity to cater for the lifetime arisings of both units. It is built to last for the duration of all activities on the site and will continue to hold spent fuel for a period of at least 60 years after the EoG, pending removal of the fuel to the Geological Disposal Facility (GDF). The facility comprises a fuel storage pool, incorporating the spent fuel import and export facilities necessary for the safe management of the fuel over the storage period.

The ILWISF is located next to the ISFS and will hold packaged ILW arisings throughout generation. ILW generated during the 60 years of operation will be conditioned in the Effluent Treatment Building. The packages will be transported into the separate ILWISF. The ILWISF will provide interim storage for ILW pending removal to the GDF, thereby allowing ultimate delicensing and return of the site to an end state agreed by the regulators and the local planning authority. The design lifespan of the ILWISF is 100 years, although strategically it is planned that the facility will be emptied during the decommissioning of the site.

There is a small Conventional Waste Storage Area where conventional waste is stored temporarily prior to transfer off-site for disposal.

The transit area for LLW comprises of a loading area located next to the garage handling facilities.

2.3.5 Ancillary Office and Storage Buildings

The ancillary buildings comprise the following structures:

- Security and Control Access building;
- Entry Relay Store;
- Security Force Control Centre;
- Medical Centre;
- Restaurant;
- Simulator building;
- Training Centre;
- Public Information Centre;

- Emergency Service building.

2.3.6 Office Buildings

The office buildings comprise:

- Operational Service Centre;
- EDF Site Offices;
- Contractor Administration Building.

2.3.7 Storage Buildings/Garage

The storage buildings comprise:

- Radioactive Source Store;
- Garage for handling facilities;
- Oil & Grease Storage;
- Oil Ancillary building;
- EDF Warehouse;
- AREVA Warehouse;
- Raw Water Supply and Storage Basin.

2.3.8 Other Buildings

Other site structures include:

- Permanent Sewage Treatment Plant;
- Helipad;
- Substation;
- Meteorological Station.

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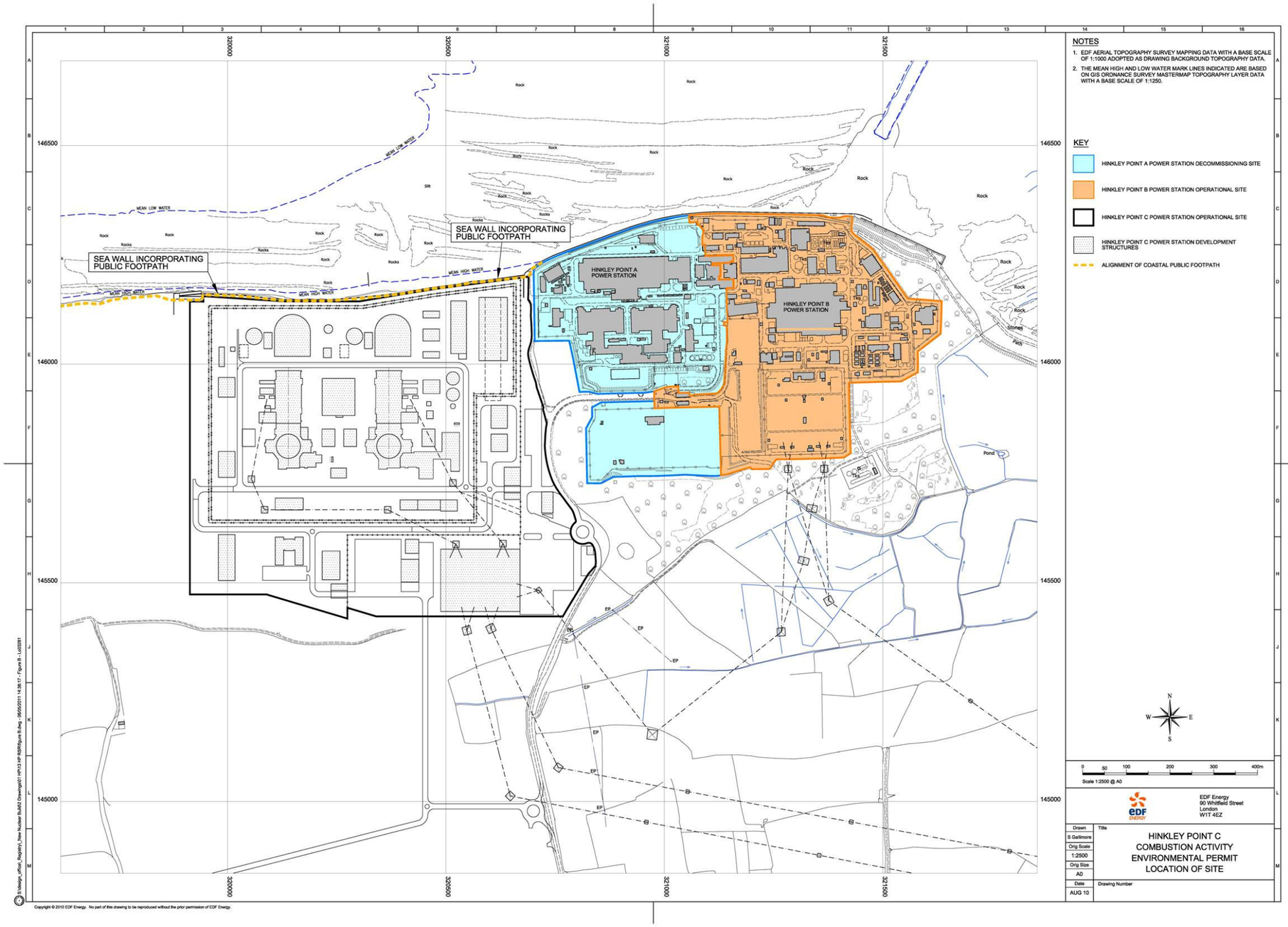
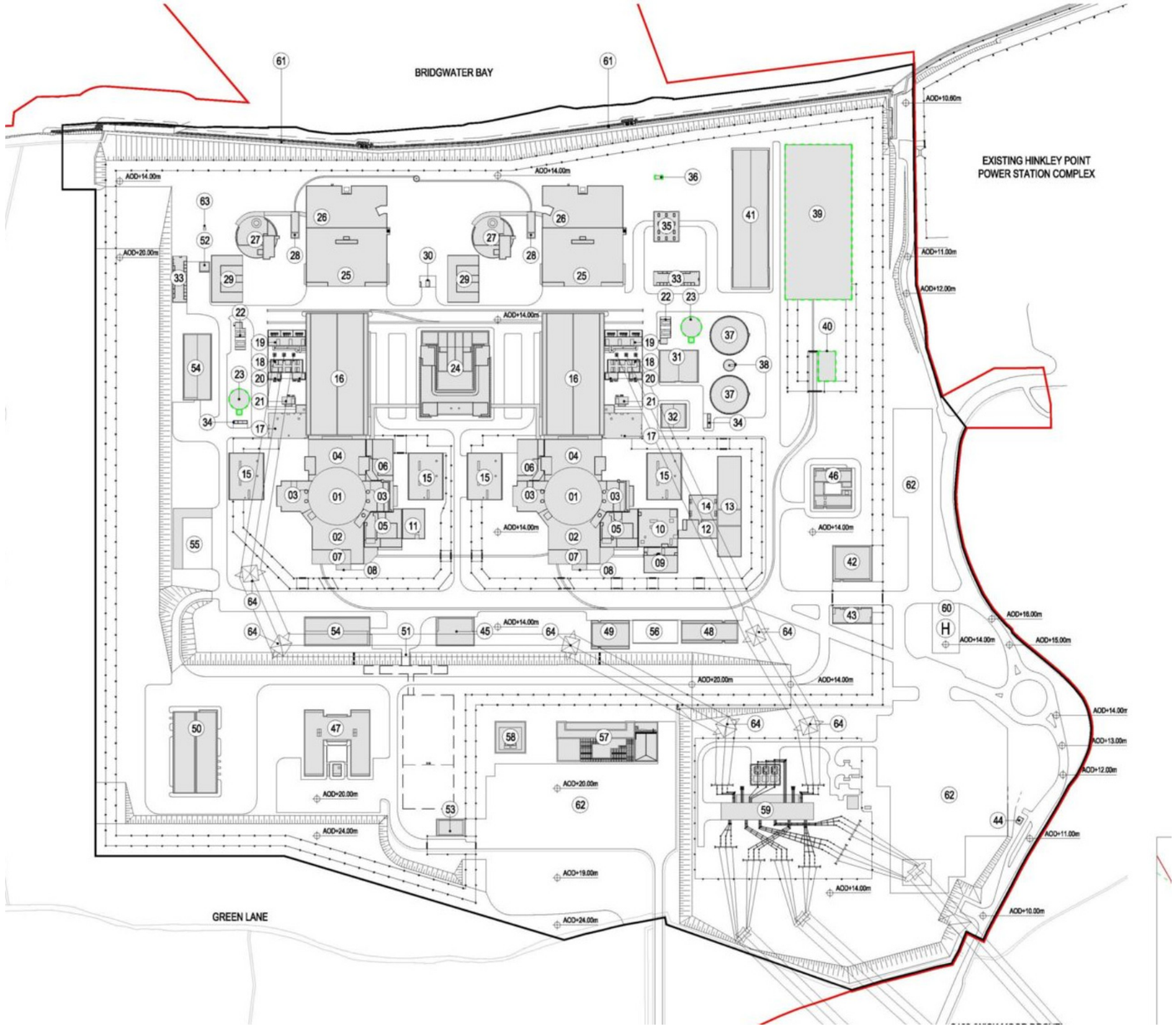


Figure 2: Hinkley Point Site Location Plan



INTERNAL BUSINESS COLLABORATOR REFERENCE
HPC-GEN047-U0-000-DRW-000001

NUCLEAR ISLAND
01 REACTOR BUILDING
02 FUEL BUILDING
03 SAFEGUARD BUILDING
04 SAFEGUARD BUILDINGS
05 NUCLEAR AUXILIARY BUILDING
06 ACCESS TOWER
07 FUEL BUILDING HALL
08 BORON STORAGE
09 RADIOACTIVE WASTE STORAGE BUILDING
10 RADIOACTIVE WASTE PROCESS BUILDING
11 RADIOACTIVE WASTE TREATMENT BUILDING (UNIT 2)
12 HOT LAUNDRY
13 HOT WORKSHOP, HOT WAREHOUSE, FACILITIES FOR DECONTAMINATION
14 EFFLUENT TANKS
15 EMERGENCY DIESEL GENERATORS

CONVENTIONAL ISLAND
16 TURBINE HALL & SKYBRIDGES
17 NON-CLASSIFIED ELECTRICAL BUILDING
18 GAS INSULATED SWITCH GEAR
19 MAIN TRANSFORMER
20 UNIT TRANSFORMER
21 AUXILIARY TRANSFORMER
22 HYDRAZINE & AMMONIA STORAGE
23 AUXILIARY FEEDWATER STORAGE

OPERATIONS
24 OPERATIONAL SERVICE CENTRE

COOLING WATER PUMPHOUSE & ASSOCIATED BUILDINGS
25 COOLING WATER PUMPHOUSE
26 FOREBAY
27 OUTFALL POND (SURGE CHAMBER)
28 FILTERING DEBRIS RECOVERY PIT
29 FIRE-FIGHTING WATER BUILDING

REMAINING BALANCE OF PLANT & OTHER PLANT
30 ATTENUATION POND
31 DEMINERALISATION STATION
32 AUXILIARY BOILERS
33 HYDROGEN STORAGE
34 OXYGEN STORAGE
35 CHEMICAL PRODUCTS STORAGE
36 SEWAGE TREATMENT PLANT
37 CONVENTIONAL ISLAND WATER STORAGE TANK
38 NUCLEAR ISLAND WATER STORAGE TANK

FUEL & WASTE STORAGE
39 INTERIM SPENT FUEL STORE
40 ACCESS CONTROL BUILDING
41 INTERMEDIATE LEVEL WASTE INTERIM STORAGE FACILITY

ANCILLARY, OFFICE & STORAGE
42 MAIN ACCESS CONTROL BUILDING
43 ENTRY RELAY BUILDING
44 OFF-SITE VEHICLE SEARCH AREA
45 AUXILIARY ADMINISTRATION CENTRE
46 MEDICAL CENTRE
47 EDF SITE OFFICES
48 GARAGE FOR HANDLING FACILITIES
49 OIL & GREASE STORAGE + OIL ANCILLARY BUILDING
50 AREVA WAREHOUSE
51 RAW WATER AND POTABLE WATER SUPPLY
52 METEOROLOGICAL STATION
53 OUTAGE ACCESS CONTROL BUILDING
54 CONTAMINATED TOOLS STORAGE
55 CONVENTIONAL WASTE STORAGE
56 TRANSIT AREA FOR VERY LOW LEVEL WASTE AND LOW LEVEL WASTE

PUBLIC & TRAINING
57 SIMULATOR BUILDING / TRAINING CENTRE
58 PUBLIC INFORMATION CENTRE

NATIONAL GRID SUBSTATION
59 NATIONAL GRID SUBSTATION

OTHER SITE STRUCTURES
60 HELIPAD
61 SEA WALL (INCORPORATING COASTAL FOOTPATH)
62 CAR PARK
63 METEOROLOGICAL STATION MAST
64 EDF ENERGY PYLONS

DRAWING SYMBOLS & LEGEND

- HINKLEY POINT C DEVELOPMENT SITE BOUNDARY (DCO)
- HINKLEY POINT C PERMANENT DEVELOPMENT SITE BOUNDARY
- TEMPORARY JETTY SEAWARD HARBOUR LIMITS
- BUILDINGS / STRUCTURES
- NATIONAL GRID 400KV PYLONS & LINES (SEE CAVEAT BELOW)
- PYLONS & LINES - EDF ENERGY STANDARD
- RAILWAY TRACKS
- FENCES
- PARAMETER BUILDINGS

THE OVERHEAD LINES AND TOWER (PYLON) POSITIONS ILLUSTRATED ARE INDICATIVE ONLY AND ARE ONE OF TWO OPTIONS PRESENTLY BEING DEVELOPED BY NATIONAL GRID. THESE OVERHEAD LINES AND PYLONS WILL BE SUBJECT TO A SEPARATE DCO APPLICATION BY NATIONAL GRID AND WILL BE REFINED FOLLOWING PUBLIC CONSULTATION, FURTHER ENVIRONMENTAL STUDIES AND DETAILED OVERHEAD LINE DESIGN.

REACTOR CENTRELINE OS CO-ORDINATES

UNIT 1	320369,3912mE 145812,1430mN	NOTE: ALL CO-ORDINATES ARE IN METRES AND ARE BASED ON THE ORDNANCE SURVEY NATIONAL GRID
UNIT 2	320139,3912mE 145812,1430mN	

Taken from:
HPC-GEN047-U0-000-DRW-000001
Rev. 1.0 Sept 2011

Figure 3: Hinkley Point C Power Station Site Plan

3 DECOMMISSIONING AND WASTE MANAGEMENT STRATEGY AND PLAN

3.1 CORPORATE STRATEGY & PLAN

At the end of its operational life, NNB GenCo will undertake the decommissioning of HPC in accordance with this DWMP, which takes full account of the requirements of the Corporate Decommissioning Strategy & Plan (Ref. 5), Government Policy and regulatory requirements.

3.2 HINKLEY POINT C DECOMMISSIONING STRATEGY

A Corporate Decommissioning Strategy & Plan has been adopted by NNB GenCo for the decommissioning of its EPR power station sites. This sets out the principles and strategy for the decommissioning of the EPR.

The preferred decommissioning strategy selected for HPC is Early Site Clearance (ESC). Decommissioning will commence as soon as possible after EoG at the site. Decommissioning will continue without cessation until all parts of the power generation plant are removed and the site cleared so that it could be released from nuclear site licence requirements. The ISFS will remain in operation on the site for a period of about 60 years after EoG Unit 1, providing the GDF is available to receive the spent fuel, after which it too will be decommissioned and the site cleared. It is currently assumed that for this twin reactor site, Unit 2 will shutdown 18 months after Unit 1.

The Early Site Clearance strategy has been adopted for HPC largely because the technical constraints and complexity of decommissioning an EPR site are not significantly reduced by delaying decommissioning or by periods of safe storage. International experience typically supports this approach, and has shown that water reactors can be safely decommissioned on a relatively short timeframe without the need for an extended period of deferral to allow radioactive decay.

The Interim Spent Fuel Store and the ILW Interim Storage Facility will be decommissioned once they have been emptied of spent fuel and radioactive waste.

3.3 IMPLEMENTATION OF THE DECOMMISSIONING STRATEGY AND PLAN AT HINKLEY POINT C

The principle elements of the HPC ESC plan have been grouped into “Activities” defined as follows:

Activity 0: Pre-Closure Preparatory Work

Activity 1: Spent Fuel Management

Activity 2: Site Operation and Plant Preparation

Activity 3: Management of Operational Wastes

Activity 4: Plant Decommissioning

Activity 5: Site Clearance and Release for Re-use

These activities will overlap significantly in time, and are not necessarily sequential. The whole decommissioning programme is expected to be completed within about twenty years of EoG (excluding the ISFS). The full scope also includes overarching costs such as NNB GenCo corporate support, the operating costs of the Nuclear Decommissioning Fund Company Limited (FDP Co) and costs incurred by DECC in relation to the FDP and as set out in the Nuclear Decommissioning and Waste Handling (Finance and Fees) regulations.

The actual timing of reactor dismantling and associated tasks for HPC will be kept under review and will be set out in the Decommissioning Schedule as provided at summary level within this DWMP.

A summary description of the decommissioning plan is presented below, and is developed in greater detail in the supporting Detailed Decommissioning and Waste Management Plan.

3.3.1 Pre-Closure Preparatory Work (Activity 0)

Five years before the planned closure date for a station, a programme of preparatory work will be initiated to ensure that there is no delay to commencement of decommissioning following EoG and to ensure that the site is decommissioned safely, and as efficiently and economically as possible. This will include for example:

- Initiation of final fuel cycle
- Preparation of final core safety case
- Preparation of Detailed Decommissioning Plan and Near Term Work Plan
- Preparation of Article 37 data submission
- Preparation of EIA
- Planning Application
- Preparation of decommissioning arrangements
- Preparation of decommissioning programme
- Revisions to outage management
- Revisions to maintenance schedule
- Revisions to discharge and disposal authorisations
- Revisions to licence compliance arrangements where appropriate, more specifically site safety management arrangements and plant modification proposals.

In many cases regulatory approval of the submissions will be required, which may have long lead times. It is therefore anticipated that this activity will need to be commenced at least five years before the planned EoG.

The scope of Activity 0 is discussed in more detail in Section 4.1 and in the supporting DDWMP (Ref. 9) Chapter 9.

3.3.2 Spent Fuel Management (Activity 1)

The scope of this activity covers all fuel management related issues from defuelling of the reactors up to and including final disposal of the spent fuel to the GDF.

The first major activity following cessation of generation at each reactor will be the defuelling of the reactors and the transfer, following a period of cooling, of the spent fuel to the ISFS. This is a routine operation on an PWR reactor, which will have been carried out many times during the plants operational life.

Defuelling of the reactor will proceed as soon as practicable following reactor shutdown and will be completed as soon as is reasonably practicable. The process will be undertaken using the existing fuel handling equipment, safety case and operational procedures. Any new fuel that remains on the station at the time of shutdown will be dispatched off site. It is assumed that Unit 2 will cease generation about 18 months after Unit 1, and its reactor will be defuelled as above.

Complete core fuel removal from a PWR is a straightforward activity and it is expected that the fuel will be removed from the core within a few weeks of EoG. The fuel is still required to remain in storage in the Fuel Building Fuel Cooling Pool for a period of about 3 years until the fuel has cooled sufficiently to enable its transfer to the on-site ISFS.

Based upon current studies undertaken by the Radioactive Waste Management Directorate (RWMD), the fuel is expected to remain in storage in the ISFS for a period of approximately 55 years after removal of the final core from the reactor to permit sufficient cooling for disposal. For a reactor operational life of 60 years, the last fuel removed will be at EoG (at T+60), where T is the start-up date. Again based upon studies undertaken to determine the rate at which fuel may be placed in the GDF, and a design for a suitable facility to package the spent fuel, it is estimated that all of the fuel can be removed from the store over a period of less than 10 years. Thus it is estimated for planning purposes that fuel removal from the ISFS will be completed at about T+125.

Prior to emplacement in the GDF, the fuel has to be packaged (encapsulated) in a disposal container. For this report, it is assumed that the Spent Fuel Encapsulation Facility (SFEF) will over-pack the spent fuel into durable, corrosion-resistant disposal canisters manufactured with a sealed copper covering which would provide long-term containment for the radio-nuclides contained within the spent fuel. The copper canisters would each hold four spent fuel assemblies.

There is currently no assumption regarding the location of the encapsulation facility, but for liabilities planning purposes only, it is assumed that the facility will be constructed on site, and that the fuel would be despatched from the facility in transport containers carrying a single canister of four spent fuel assemblies on each journey to the GDF. The packaged fuel will then be disposed to the GDF. This approach will ensure a prudent estimate for the cost of the SFEF and spent fuel transport costs.

There will also be a decommissioning activity associated with the SFEF and the on-site ISFS. The site clearance and delicensing of the area of the site occupied by the ISFS will be carried out once the spent fuel has been removed from the store and disposed of offsite.

The scope of Activity 1 is discussed in more detail in Section 4.2 and in the supporting DDWMP, Chapter 10, with the basis of estimate set out in Chapter 18, Section 18.2.1.

3.3.3 Site Operation and Plant Preparation (Activity 2)

As defuelling and other decommissioning work proceeds, various systems are required to remain operational to maintain the safe operation of the plant and decommissioning tasks. The remaining plant and systems that are no longer required will be taken out of service and isolated, drained and purged or flushed and vented to make them safe. Redundant electrical systems will be isolated and made safe, and potentially hazardous materials will be removed off site as soon as is reasonably practicable. This activity commences with EoG at Unit 1 and extends over the whole period of decommissioning as plant and equipment becomes redundant.

Station resource levels required to operate and maintain the required operational plant have been estimated. In addition, there are a number of site and corporate overhead costs associated with the operation and decommissioning of the site post EoG. These change as time and decommissioning progresses, and are incorporated into the overall costs.

A number of changes to the plant are included in this activity to facilitate decommissioning, e.g. the provision of an alternative active effluent discharge line and the establishment of an alternative site electrical supply and a decommissioning electrical distribution system to enable the isolation and decommissioning of the operational systems.

Primary Circuit Decontamination is included under this activity because it utilises operational plant and resources, plus the provision of the chemical treatment and processing facilities and operators under contract.

The scope of Activity 2 is discussed in more detail in Section 4.3 and in the supporting DDWMP, Chapter 11.

3.3.4 Management of Operational Wastes (Activity 3)

The plant is equipped with the necessary facilities for the retrieval and processing of its operational wastes. During operation of the site, the packaged LLW will be disposed to a LLW Repository as soon as practicable, while the packaged ILW will be placed in the ILW Interim Storage Facility (ILWISF), awaiting EoG and the availability of the GDF to take the wastes. Certain of these wastes with a short “half-live” will be placed into storage in the ISFS to allow the radioactivity to reduce to levels which will permit the disposal of the waste as LLW.

For planning purposes, it is assumed that any raw operational waste accumulations are processed prior to EoG. Consequently, the only operational waste remaining to be retrieved and processed after EoG are those in the operational vessels. These operational wastes such as filters, sludge and ion-exchange materials will be retrieved at the earliest practicable opportunity after EoG. They will be processed using the existing operational waste processing facilities in preparation for their off-site disposal. In line with the FDP Guidance Base Case assumptions, it is assumed that LLW will be dispatched to the Low Level Waste Repository (LLWR) or a successor facility promptly after it has been generated. For ILW it is assumed that a GDF is available to take these wastes at EoG, so the packaged waste arising from

the processing plant will be consigned directly to the GDF. It is also assumed that the packaged waste in storage can be retrieved from the ILWISF and despatched to the repository for disposal at this time. This is a deviation from the FDP Guidance Base Case assumption, which is that ILW arising from operations and decommissioning will be stored in safe and secure interim storage facilities on the site of the power station, pending disposal. This assumption will be subject to revision in the event that GDF is not available as currently assumed.

The costs of disposal of the Operational ILW arisings are separately reported for fund assessment purposes.

The scope of Activity 3 is discussed in more detail in Section 4.4 and in the supporting DDWMP, Chapter 12.

3.3.5 Plant Decommissioning (Activity 4)

This Activity covers the complete decommissioning of all plant, equipment, buildings and facilities at the site, and the management of the wastes arising from the process. The activity includes all permanent buildings and facilities on the site as indicated on the Site Plan (Figure 3). The decommissioning of the ISFS and Spent Fuel Encapsulation Facility are included within Activity 1 to maintain the easy segregation of the fuel management costs. It is assumed that the site construction facilities will be removed following completion of construction at the site.

The scope of work includes the decommissioning of the reactor and primary circuit and all other plant and equipment in the Nuclear Island, the processing of the wastes arising, and their packaging for disposal or recycling as appropriate. The costs of disposal of the decommissioning ILW arisings have been separately reported for fund assessment purposes.

This activity further includes the decommissioning of the non-radioactive plant and buildings which together represent the Conventional Island, including all power generation plant, ancillary plant and offices and welfare facilities. The offshore structures will be demolished to the seabed, and onshore sections of the cooling water tunnels will be backfilled. This work is technically less challenging and can be more easily achieved thus providing a more rapid reduction in the visual impact of the site. Plant and materials will be recycled and wastes minimised as far as possible.

All structures, roads, hard standings, cable and pipe trenches will be removed to a metre below ground level. Basements will be punctured to permit free flow of groundwater. The activity covers the management of the waste materials, infilling of basement areas and tunnels and regrading of the decommissioned areas. Inert non-radioactive materials will be retained on site and used for the infilling where possible, supplemented, if necessary, with imported material.

During Activity 4, the arrangement and extent of site services will be reduced and/or modified as appropriate to suit the demand while maintaining safety. Radiological surveys of all buildings will be undertaken once plant has been removed from them and decontamination carried out, where necessary, prior to conventional demolition. Removal of the site infrastructure will follow together with further radiological monitoring.

The construction of a Decommissioning Waste Management Facility (DWMF) on the site is also included here. This facility is required to dismantle large plant items such as the steam generators, removed from the Nuclear Island, and to process the decommissioning LLW and ILW resulting from decommissioning of contaminated or

activated plant from the Nuclear Island. A single facility will be constructed in the Turbine Hall of Unit 1 to serve the management of the decommissioning wastes from both Units. This facility will be decommissioned once the processing of wastes from the Nuclear Island is complete, thereby enabling the final decommissioning of the Turbine Hall of Unit 1. It is assumed that the DWMF will not be required for the processing of wastes arising from the decommissioning of the ISFS and the ILWISF.

The scope of Activity 4 is discussed in more detail in Section 4.5 and in the supporting DDWMP, Chapter 13.

3.3.6 Site Clearance & Release for Re-use (Activity 5)

The completion of the decommissioning process will be the eventual and complete radiological clearance and delicensing of the site.

Site clearance monitoring, remediation and landscaping will be undertaken in two phases. The first and largest phase will be undertaken following completion of the decommissioning of the power generating plant area and ILWISF. At this stage, the ISFS will still be operational. The second phase will be undertaken on completion of emptying and decommissioning of this facility.

It is assumed for liabilities planning purposes that the power generating site area's site licence will be terminated on completion of decommissioning of the plant and any activities necessary to enable NNB GenCo to terminate the licence will be carried out. The ISFS area of the site will be relicensed so that the facility can be transferred to another appropriate licensee at the Transfer Date, to enable the continued storage of spent fuel pending dispatch to the GDF under the WTC. Again, upon completion of fuel despatch and decommissioning of the ISFS, a radiological and chemical survey will be undertaken and any necessary remediation carried out. At this stage, it is assumed, for liabilities estimation purposes, that this area of the site will be delicensed.

For each phase, an environmental monitoring programme will be undertaken to check for the presence of any residual radiological or chemical hazards on the area of site concerned. On completion of any necessary ground remediation work, the site will be clearance monitored to check that all radioactive materials of regulatory concern have been removed from the site, and it can then be delicensed. On completion of the final phase, the site will be made available for re-use, thus completing the decommissioning process.

The scope of Activity 5 is discussed in more detail in Section 4.6 and in the supporting DDWMP, Chapter 14.

3.4 EPR WORK BREAKDOWN STRUCTURE (EPRWBS)

The decommissioning of HPC is a complex project of long duration. The purpose of the DWMP is to define the scope of work of the decommissioning project and to ensure that accurate and up to date estimates of the costs of decommissioning and waste management and disposal are provided, to demonstrate that prudent provision will be made to meet these costs. To this end an EPR Work Breakdown Structure (EPRWBS) has been produced which defines the work packages and the engineering activities which need to be carried out to decommission HPC, manage the associated wastes and bring the site to its defined end state. The EPRWBS sets

out the work elements, which permits the examination of the scope of work, the schedule for that work and the associated cost estimates.

The EPRWBS is structured to set out the process of decommissioning each unit on the site and of the common facilities or site wide activities. Consequently, the EPRWBS is coded as 1.HPC.U1, 1.HPC.U2, 1.HPC.Com as appropriate with a further breakdown at the next level against each of the main decommissioning activities as shown in the table below.

EPRWBS Code	Description
1	EDF EPR Fleet
1.HPC	HPC
1.HPC.XX	Unit (U1 - Unit 1, U2 - Unit 2 or Com – Common to both Units)
1.HPC.XX.00	Pre-Closure Preparatory Work (Activity 0)
1.HPC. XX.01	Fuel Management (Activity 01)
1.HPC. XX.02	Site Operation and Plant Preparation (Activity 02)
1.HPC. XX.03	Management of Operational Wastes (Activity 03)
1.HPC. XX.04	Plant and Reactor Decommissioning (Activity 04)
1.HPC. XX.05	Site Clearance and Release for Reuse (Activity 05)

The EPRWBS defines all the engineering activities which need to be carried out and the timing and duration of these activities. The elements that contribute to the engineering activities, such as labour, materials and capital purchases (e.g. waste processing equipment) are included to build up the overall programme cost estimate. These activities will overlap significantly in time, and are not necessarily sequential. The whole decommissioning programme is expected to be completed within twenty years of EoG.

The EPRWBS is set out in Section 11, Table 10 to Table 12.

The detailed timing of reactor dismantling and associated tasks for HPC will be kept under review and will be determined using a Best Available Techniques (BAT) and As Low as Reasonably Practicable (ALARP) assessments in line with industry guidance and best practice. The timing will also be strongly influenced by regulatory, societal and technological developments in decommissioning and radioactive waste management. The availability of a suitable repository for decommissioning ILW and LLW will be a key consideration in determining this timing.

The scope of each activity is summarised in Sections 3 and 4 of this DWMP, the site schedule is presented in Section 5 and the costs are presented in Section 6.

The EPRWBS provides the structure against which the project can be planned and developed so that work tasks relate to each other in a logical way and that the sequence of tasks can be clearly understood. While this structure is important for project planning and execution purposes, it does not subdivide the total work scope in a way that reflects the way in which the work will be funded. This requirement is met by the introduction of the EPR Cost Reporting Structure (EPRCRS).

3.5 EPR COST REPORTING STRUCTURE (EPRCRS)

Cost estimates for the Designated Technical Matters are reported against the (EPRCRS) shown in Section 11, Table 13. This is closely based upon the structure given in the FDP Guidance and includes some additional codes for internal reporting processes.

4 DESIGNATED TECHNICAL MATTERS

The FDP Guidance states that the Decommissioning and Waste Management Plan is the part of the FDP that sets out:

- details of the steps to be taken in relation to the technical matters; and
- estimates of costs likely to be incurred in connection with the Designated Technical Matters.

Within the overall scope of the DWMP, there are several areas of the work which are Technical Matters, but which are not classified as Designated Technical Matters. The Technical Matters which are Non-Designated, are included in Section 9 because they impact upon the Designated Technical Matters, and provide an aid to understanding the complete picture.

4.1 PRE-CLOSURE PREPARATORY WORK – ACTIVITY 0

This activity covers the work necessary to facilitate a smooth transition from an operational to a decommissioning power station.

EPRWBS:
Common: 1.HPC.Com.00 – Pre-closure Preparatory Work

EPRCRS:
Common: 01.01.02.09.06.14.03 – Pre-Closure Planning

Decommissioning is the final phase of the lifecycle of a site and while it is conducted under the same regulatory regime as the operation of the site, it involves a significant technical and cultural change in the work to be undertaken and for the personnel on site.

As the site nears the end of its operational life, it is essential that the necessary work is undertaken to facilitate a smooth transition from operation to decommissioning without undue delay. This requires the preparation of a number of regulatory submissions, development of other documentation and procedures, and the establishment of the project teams to manage the processes.

Preparatory work for the shutdown and decommissioning of the plant will commence five years before the planned closure date of Unit 1. A team will be established whose composition and size will develop as the workload increases. The work to be undertaken will include for example:

- Initiation of final fuel cycle
- Preparation of final core safety case
- Preparation of Detailed Decommissioning Plan and Near Term Work Plan
- Preparation of Article 37 data submission
- Preparation of Environmental Impact Assesment (EIA)
- Planning Application
- Preparation of decommissioning arrangements

- Preparation of decommissioning programme
- Revisions to outage management
- Revisions to maintenance schedule
- Revisions to discharge and disposal authorisations
- Revisions to licence compliance arrangements where appropriate, more specifically site safety management arrangements and plant modification proposals.

A Programme Office will be established on the site to programme, monitor and report on decommissioning progress. It is assumed that HPC will be the first NNB GenCo site to decommission, and therefore costs will be incurred in establishing the detailed processes and procedures necessary to release funding to pay for decommissioning in line with the approved FDP arrangements.

Work will be undertaken to initiate the final fuel cycle and to prepare for EoG of each unit, with the aim of minimising site operational costs after shutdown. This will include revisions to outage management, site safety management arrangements, engineering change procedures and maintenance schedules in preparation for EoG.

Work will be undertaken to obtain the necessary regulatory permissions and consents for decommissioning to proceed in a timely manner. This includes updating of the site decommissioning strategy, preparation of site specific decommissioning arrangements, further development of the DDWMP into an executable plan, the submission for the Environmental Impact Assessment for Decommissioning Regulations 1999 (EIADR), the submission for planning consent for decommissioning, preparation of data in support of an Article 37 submission by the UK in compliance with the requirements of the Euratom Treaty, submissions in support of revised Environmental Permits for the disposal of radioactive and non-radioactive wastes and revision of the site's Environmental Programme. Other documentation will include preparation of decommissioning safety submissions and preparation of documentation in support of Letters of Compliance (LoCs) for disposal of higher activity wastes.

The scope of the work described under Activity 0 is classified as a Designated Technical Matter, and is set out in detail in the supporting DDWMP Chapter 9.

4.2 SPENT FUEL MANAGEMENT – ACTIVITY 01

The Interim Spent Fuel Store (ISFS) will be constructed as part of the construction works for HPC. The ISFS comprises a storage pool with a capacity sufficient for the total lifetime inventory of spent fuel from both reactors. The fuel is stored and moved in boronated steel racks within the pool, which support the spent fuel assemblies, ensure adequate cooling flow, and ensure that there is no risk of a criticality event. The facility is protected from aircraft impact by a massive heavily reinforced concrete shell.

The cooling water temperature is maintained by an indirect system, employing an intermediate water circuit, connected to a series of cooling towers. Under most operating conditions the system is designed to be passive, with both the water and air flows driven by natural circulation. Pumps and fans are also provided should

these be required. A number of services such as electrical and water supplies, security, accommodation and welfare, required for the operation of the ISFS are provided from the power station. New services will be required to replace those currently provided by the power station as part of the conversion to an autonomous facility following EoG.

Fuel management and storage operations prior to EoG are Technical Matters and are paid for from operational revenue. These described in Section 9.1 following, and further detailed in the supporting DDWMP Chapter 10 and Chapter 18, Section 18.2.1.

Following EoG, all spent fuel management costs are Designated Technical Matters, with the costs falling to the fund. The following describes the aspects of spent fuel management after End of Generation (EoG), from its removal from the reactors, through subsequent storage, and processing concluding with its disposal at the GDF. Further detail is provided in the DDWMP Chapter 10.

The over all process may be summarised as follows:

- Conversion of the Interim Spent Fuel Store into a stand alone facility
- Operation and maintenance of the Interim Spent Fuel Store after EoG
- Spent fuel encapsulation facility
    - Planning
    - Construction
    - Operation
    - Decommissioning
- Spent fuel transport and disposal
- Decommissioning of Interim Spent Fuel Store

For planning purposes, a conservative estimate of the total spent fuel inventory has been utilised. This is based upon an 18 month refuelling cycle with 88 fuel assemblies replaced on each occasion, giving a total of 7346 spent fuel assemblies. This is further detailed in the DDWMP Chapter 10.

Title to and liability for spent fuel will transfer to Government under the WTC at the end of decommissioning. Hence some of the activities set out in this section, i.e. interim storage of the spent fuel, encapsulation, transport to the GDF and the decommissioning of the ISFS will be undertaken after transfer.

After the Transfer Date the Government will be responsible for ensuring the future management of the waste. However in line with the FDP Guidance, the plans for the period between the Transfer Date and the Assumed Disposal Date are prepared to the same standard as the plans for the period before the Transfer Date.

4.2.1 Conversion of Interim Spent Fuel Store into to an Autonomous Storage Facility independent of the power generating plant.

EPRWBS:
Common: 1.HPC.Com.01.015.020 - Convert ISFS to an autonomous facility at EoG.

EPRCRS:
Common: 01.01.02.09.04.02.01 – Conversion of ISFS to an autonomous facility at EoG.

During the operational life of the power station and the earliest phases of decommissioning, the ISFS derives many of its essential and support services from the operating power station, e.g. site security, personnel accommodation, suitable active effluent treatment capacity, site monitoring and radiological control, grid supply, and power supplies.

After EoG of both units, many of the services normally provided by the power generating plant/site will be withdrawn and decommissioned. New facilities will need to be constructed in, or in the vicinity of, the ISFS to provide these services via an alternative means independent of the power station. These will include for example new site security arrangements, fences and monitoring; new office, workshop and welfare accommodation for the staff who will continue to operate and maintain the ISFS; new arrangements for the treatment and discharge of active effluent; changes to the provision of electrical supply to the ISFS; changes to the road layout. Work will be undertaken during the decommissioning of the power station plant to provide these new facilities and services to enable the ISFS to operate independently of the remainder of the site.

The work to be undertaken is further detailed in the supporting DDWMP Chapter 10 Section 10.7, the cost of these works being classified as a Designated Technical Matter.

4.2.2 Operation and Maintenance of the Interim Spent Fuel Store after EoG

EPRWBS:
Common: 1.HPC.Com.01.015.025 – ISFS Operation after EoG

EPRCRS:
Common: 01.01.02.09.04.02.00 – Operation and Maintenance of ISFS after EoG

Fuel management and storage operations prior to EoG are Technical Matters and are paid for from operational revenue. These are described in Section 9.1, and further detailed in the supporting DDWMP Chapter 10 and Chapter 18 Section 18.2.1. All activities after EoG are Designated Technical Matters.

The first major activity following EoG will be the defuelling of the reactors, which will be undertaken using the existing fuel handling equipment, safety case and operational procedures. Any new fuel that remains on the station at the time of shutdown is regarded as an asset and will be transported off site for use at another facility if compatible, or back to the manufacturer for reuse.

The spent fuel will be removed from each reactor and transferred to the Fuel Cooling Pool. Once sufficiently cooled, expected to be after approximately 3 years, it will be transferred to the ISFS for long term interim storage.

Following EoG of Unit 1, removal of the fuel from the reactor will commence as soon as practicable. It is assumed that the Unit 2 will shutdown 18 months after the first and will be defuelled in a similar manner to Unit 1. Complete core fuel removal from the EPR units at HPC is a quick, routine activity and it is expected that the fuel will be removed from the reactor core within a few weeks of EoG. The cost of this process and the storage of the spent fuel in the Fuel Building Pool is covered under the

continued operation of these facilities and their associated staffing under Activity 2, where all ongoing costs of operation of the site after EoG are included.

The ISFS accommodates the arisings of spent fuel over the lifetime of HPC. It comprises a fuel storage pool, spent fuel import and export facilities and all other facilities necessary for the safe management of the fuel over the storage period, including the management of solid wastes and liquid effluents arising from spent fuel storage.

The timing of disposal of spent fuel in the GDF will be determined under the WTC, which will provide NNB Genco with an "Assumed Disposal Date" for the purposes of preparing a DWMP. It is currently assumed that disposal will begin in 2138 (refer to Section 5) and therefore the spent fuel will remain in storage for a period of around 65 years after EoG.

The ongoing annual cost of storage of the spent fuel in the ISFS for a period of up to 65 years after EoG (based upon about 55 years cooling plus about 9 ½ years emptying), is a Designated Technical Matter. The overall cost includes the ongoing operation and maintenance, plant replacement costs, management of additional radioactive wastes, the regulatory and security arrangements, and corporate overheads.

The DDWMP and its associated schedule have been used to determine an assumption for the date at which the repository will be required to accept spent fuel from HPC, and the rate at which the fuel will be accepted. This data will inform the WTC, but will be subject to the actual dates specified in the agreed WTC from time to time.

4.2.3 Spent Fuel Encapsulation Facility

EPRWBS:
Common: 1.HPC.COM.01.015.037 – Spent Fuel Encapsulation Facility Planning

1.HPC.Com.01.015.040 – Spent Fuel Encapsulation Facility Construction

1.HPC.Com.01.015.045 – Spent Fuel Encapsulation Facility Operation

1.HPC.Com.01.015.050 – Spent Fuel Encapsulation Facility Decommissioning.

EPRCRS:
Common: 01.01.02.09.04.05.01 – Spent Fuel Encapsulation Facility Construction

01.01.02.09.04.05.02 – Spent Fuel Encapsulation Facility Operation

01.01.02.09.04.05.03 – Spent Fuel Encapsulation Facility Decommissioning.

Following completion of removal of all spent fuel from the ISFS and prior to emplacement in the repository, the fuel has to be encapsulated in a disposal container. This new Spent Fuel Encapsulation Facility (SFEF) will have to be built as part of the ongoing spent fuel management process and will include:

- SFEF Planning and Consents;
- SFEF Construction;
- SFEF Operation and:
- SFEF Decommissioning.

The current dates and timescales of each of the above is set out in the HPC Summary Decommissioning Schedule Section 5 Figure 4.

There is no assumption about the actual location of such a facility for this process, however, for liabilities estimation purposes only, and to determine a prudent cost estimate, the facility is assumed to be located on the HPC site. The facility is designed to accept flasks containing spent fuel from the ISFS and to transfer these from the transport container to disposal canisters into which they are sealed. These canisters are subsequently transferred to the GDF for disposal. The cost estimates are based upon a design throughput of 200 canisters of four spent fuel assemblies per year, with an overall processing period of about 9 ½ years. The construction cost estimates include the considerable cost of the planning process for such a facility.

The Spent Fuel Encapsulation Facility is currently anticipated to be a facility serving only HPC although, should Sizewell C Nuclear Power Station (SZC) proceed, there is an opportunity, subject to consideration of the practicability, to share the facility to serve both HPC and SZC, effectively halving the construction and decommissioning costs. For planning purposes, it is assumed that following the end of its cooling period, HPC fuel will be encapsulated and disposed to the GDF at the earliest opportunity. The end of operation of the Spent Fuel Encapsulation Facility will follow encapsulation of the last batch of spent fuel.

The construction operation and decommissioning of this facility is further detailed in the supporting DDWMP Chapter 10 Sections 10.9 and 10.10, the cost being classified as a Designated Technical Matter. The work is expected to be undertaken after the Transfer Date, and will consequently be carried out by Government.

4.2.4 ISFS Decommissioning

EPRWBS:
Common: 1.HPC.Com.01.015.035 – ISFS Decommissioning.

EPRCRS:
Common: 01.01.02.09.01.02.03 - Decommissioning Processes / Operations

At the end of fuel removal and despatch operations, the ISFS and its supporting facilities will be decommissioned. This will include the:

- Removal of the spent fuel storage racks and other equipment from the fuel storage pool.
- Decontamination of the racks and equipment and the facility
- Deplanting and decommissioning of the plant and equipment
- Processing and packaging of the radioactive wastes, including the disposal of any ILW in accordance with the WTC.
- Demolition of the buildings, backfilling and restoration of the site

The final site clearance and delicensing of the site will be carried out on completion of these steps. This is the second phase of the site clearance task, the first having been carried out some years earlier on the power plant area of the site.

The decommissioning of this facility is further detailed in the supporting DDWMP Chapter 10 Section 10.12, the cost being classified as a Designated Technical Matter. The work is expected to be undertaken after the Transfer Date, and will consequently be carried out by Government.

4.2.5 Spent Fuel Transport and Disposal

EPRWBS:
Common: 1.HPC.Com.01.015.030 - Spent Fuel Transport and Disposal

EPRCRS:
Common: 01.01.02.09.04.07.05 - Spent Fuel Transport

01.01.03.09.04.09.06 - Spent Fuel Disposal

The currently planned timing and rate of disposal and the cost of disposal are subject to the terms of the Waste Transfer Contract between NNB GenCo and Government. The current basis aligns with the expected availability of the GDF to accept Spent Fuel from HPC at 200 canisters per year, which on the assumption of 4 assemblies per canister translates to 800 assemblies per year, and is based upon the current estimated spent fuel inventory (7,346 assemblies = 3,876TeU) and spent fuel disposal cost advice from the Department of Energy and Climate Change (DECC). The basis of estimate will be subject to Quinquennial review, with the spent fuel disposal price being fixed after a deferral period subject to the provisions of the WTC.

While there is no assumption about the actual location of the SFEF, for liabilities estimation purposes only, and to determine a prudent estimate for transport costs, the facility is assumed to be located on the HPC site.

The transport and disposal of spent fuel from HPC is further detailed in the supporting DDWMP Chapter 10 Section 10.11 and Chapter 18 Section 18.2.2.2.5, the cost being classified as a Designated Technical Matter. The work is expected to be undertaken after the Transfer Date, and will consequently be carried out by Government.

4.3 SITE OPERATION AND PREPARATION FOR DECOMMISSIONING - ACTIVITY 02

This activity covers the costs of continuing to safely operate the site after EoG utilising existing site and headquarters support staff, and the associated staff redundancy costs as decommissioning progresses. It includes the cost of the ongoing provision of services such as electricity, water and telecoms to the site.

This activity also covers the provision of some new services to enable subsequent decommissioning. The cost of decontamination of the reactor primary circuit and the associated waste management is included within the cost estimate.

The work undertaken in Activity 2 is extensive and very diverse. As a consequence, while the work can be set out in detail against the EPRWBS, it is not practicable to include the EPRCRS coding in this section because this would lead to a very long list of EPRCRS codes in each sub section.

The overall activities and cost areas may be summarised as follows:

- Making safe redundant systems and plant
- Primary Circuit Decontamination
- Site plant maintenance during decommissioning
- Plant operations during decommissioning
- Staffing levels
- Installation of new electrical supply and distribution system
- Active waste treatment system
- Maintenance of records and knowledge management system
- Offsite support and overheads
- Site overheads
- Corporate overheads

4.3.1 Making Safe Redundant Systems and Plant

EPRWBS:

Unit 1:	1.HPC.U1.02.001 – Unit 1 –	Making Safe Redundant Systems and Plant
Unit 2:	1.HPC.U2.02.001 – Unit 2 –	Making Safe Redundant Systems and Plant

Following EoG, plant and systems not required for safety reasons will become progressively redundant and will be isolated, drained and purged to make them safe, and hazardous materials will be removed off site as soon as is reasonably practicable.

Following final shutdown of the reactor(s), plant, systems and electrical equipment which are not required for future operational purposes or for safety reasons, will progressively be assessed as redundant. This assessment of redundancy will include a systematic review of the station safety case, consideration of defuelling/decommissioning requirements and engineering judgement to identify when it is possible to declare plant items and systems of no further use or need currently or for subsequent activities on the site. These will be made safe as soon as reasonably practicable, for subsequent decommissioning.

The costs are included within the provisions of Sections 4.3.5 and 4.3.9, with the work carried out further detailed in the supporting DDWMP Chapter 11 Section 11.2, the cost being classified as a Designated Technical Matter.

4.3.2 Primary Circuit Decontamination

EPRWBS:

Unit 1: 1.HPC.U1.02.003 – Unit 1 - Primary Circuit Decontamination.

Unit 2: 1.HPC.U2.02.003 – Unit 2 – Primary Circuit Decontamination

Primary Circuit Decontamination (PCD) will be carried out utilising a proprietary process to reduce the deposited contamination within the Primary Circuit components. This achieves two objectives; firstly to reduce dose to the workforce carrying out subsequent Primary Circuit dismantling, and secondly to reduce the volume and classification of the Primary Circuit decommissioning wastes.

The process includes the connection of mobile equipment to the reactor primary circuit. This equipment pumps a proprietary chemical solution around the circuit which dissolves and removes the deposited contamination, generally achieving very high decontamination factors. The contamination removed is processed via the connected mobile equipment to remove the radioactivity onto filters and ion exchange resins. The resulting radioactive wastes will then be processed and packaged for disposal at a LLW (for LLW) or GDF (for ILW) as appropriate.

The work carried out is further detailed in the supporting DDWMP Chapter 11 Section 11.3, the cost being classified as a Designated Technical Matter.

4.3.3 Site Plant Maintenance During Decommissioning

EPRWBS:

Unit 1: 1.HPC.U1.02.045 – Unit 1 – Site Plant Maintenance During Decommissioning

Unit 2: 1.HPC.U2.02.045 – Unit 2 – Site Plant Maintenance During Decommissioning

As defuelling, operational waste management and other decommissioning work proceeds, various systems are required to remain operational to maintain the safe operation of the plant. These systems will continue to be operated and maintained by suitably qualified and experienced operational personnel employing the same or very similar procedures to those utilised during the operational life of the plant. These include the safety functions, spent fuel management and waste management related plant.

The costs are included within the provisions of Sections 4.3.5 and 4.3.9, with the work carried out further detailed in the supporting DDWMP Chapter 11 Section 11.8, the cost being classified as a Designated Technical Matter.

4.3.4 Plant Operations During Decommissioning

EPRWBS:

Unit 1: 1.HPC.U1.02.050 – Unit 1 - Plant Operations during decommissioning

Unit 2: 1.HPC.U2.02.050 – Unit 2 - Plant Operations during decommissioning

The Operations Department will operate the plant within the constraints of the plant safety case as decommissioning progresses. Twenty four hour operations will be required throughout the plant while fuel remains within the reactor Fuel Storage Ponds. This will be reviewed once all the fuel has been transferred to the ISFS with most activities being performed during normal working hours.

As plant and equipment is no longer required to maintain the safety case, it will be permanently removed from service and made safe for subsequent decommissioning. Part of this process will include the general post operational clean-out of the systems and buildings. This will be undertaken by site operational staff employing procedures and processes similar to those utilised during operation.

The costs are included within the provisions of Sections 4.3.5 and 4.3.9, with the work carried out further detailed in the supporting DDWMP Chapter 11 Sections 11.4 and 11.9, the cost being classified as a Designated Technical Matter.

4.3.5 Site Staffing Levels after EoG

EPRWBS:

Common: 1. HPC.COM.02.010 – Common – Site Staffing Levels

Previous sections have outlined many of the process which continue to be carried out on the site after EoG. An estimate of the number of site staff to carry out these processes including, reactor defuelling, ISFS operation, fuel transfer between the Units and ISFS, operation, maintenance, POCO and making safe of plant, has been undertaken. The resource levels required have been estimated by a process of subtracting from the established operational site complement the resource no longer required as plant and systems are declared redundant.

Further detail is provided in the supporting DDWMP Chapter 11 Section 11.5 and 18.3.2.3, the cost being classified as a Designated Technical Matter.

Other costs necessary to maintain the site include external expenditure for provision of various services such as facilities management, cleaning, catering, waste processing etc by contract. The cost of these services is included within Section 4.3.9.

4.3.6 New Electrical Supply and Distribution System

EPRWBS:

Common: 1. HPC.COM.02.030 – Common – New Decommissioning Electrical Supply and Distribution System

A number of changes to the plant are included in this activity to facilitate decommissioning. These include the establishment of an alternative Decommissioning Electrical Distribution System to enable the isolation and decommissioning of the operational systems. An alternative Decommissioning Site Incoming Electrical supply will also be installed, to obviate the need to maintain a large and costly main grid connection.

The work carried out is further detailed in the supporting DDWMP Chapter 11 Section 11.6, the cost being classified as a Designated Technical Matter.

4.3.7 Active Waste Treatment System – New Effluent Discharge Arrangements

EPRWBS:

Common: 1. HPC.COM.02.035-40 – Common – New Effluent Discharge Arrangements

An alternative Active Effluent Discharge Line will be constructed to permit continued discharge of liquid effluent while enabling decommissioning of the Main Cooling Water Pumps. A dispersion study will be carried out at the outlet location to ensure that the discharge will satisfy activity concentration limits.

The work carried out is further detailed in the supporting DDWMP Chapter 11 Section 11.7, the cost being classified as a Designated Technical Matter.

4.3.8 Records and Knowledge Management

EPRWBS:

Common: 1.HPC.COM.02.100.050

In accordance with NNB GenCo procedures, accurate design, construction, commissioning and operational records will be created and maintained on an Electronic Document and Record Management System (EDRMS), with a small number of materials samples and a proportion of original hard copies of specific records retained in storage. Many records are required for regulatory compliance, and certain of these facilitate safe, efficient and cost effective decommissioning and waste management after EoG. As part of the transition from operation into decommissioning, a document management exercise will be carried out to identify the records required for retention and steps will be taken to ensure that they are available as required throughout decommissioning.

During decommissioning, records of the decommissioning of the plant will be created and will be added to the EDRMS. Records relating to decommissioned plant, equipment and facilities will be transferred to an archive section of the system, leaving only current records describing the state of the plant on the live EDRMS.

The work carried out is further detailed in the supporting DDWMP Chapter 11 Section 11.12, the cost being classified as a Designated Technical Matter.

4.3.9 Site Overheads

EPRWBS:

Common: 1. HPC.COM.02.100 – Common – Site Overheads

Decommissioning of the site continues to attract a considerable site overhead and this includes service contracts, consumables, IT and communications, utilities, records and knowledge management, establishment of programme management and controls, project management and site staff redundancy costs.

Re-training of site staff for the transition from operation to decommissioning will be undertaken near to EoG to address the changing safety, cultural, procedural and technical issues. The development of the training programme will be a TM prior to the end of the funding period. Implementation during the pre-closure planning and after EoG will be a DTM (Refer to DDWMP Section 11.5).

The scope under this section is further detailed in the supporting DDWMP Chapter 11 Section 11.10, the cost being classified as a Designated Technical Matter.

4.3.10 Corporate Overheads

EPRWBS:

Common: 1.HPC.COM.02.200 – Common – Corporate Support Costs

This includes the mostly offsite costs necessary to support the site decommissioning works. It includes NNB GenCo Corporate Staff Support; Regulatory Costs; Civil Nuclear Constabulary Costs; FDPCo Operating Costs; DECC Charges, Insurance costs and R&D.

To fulfil their continuing role in relation to the FDP during decommissioning, FDPCo and DECC will recover their direct costs and those of their advisors. These costs have been estimated based upon current costs.

The scope included in this section is further detailed in the supporting DDWMP Chapter 11 Section 11.14, with further information on the basis of the cost estimate in Chapter 18 Section 18.2.2.3 and 18.2.2.8. The costs are classified as Designated Technical Matters.

4.4 MANAGEMENT OF OPERATIONAL WASTES – ACTIVITY 03

How radioactive waste is managed depends to a large extent on how radioactive it is. The categories of radioactive waste defined in the UK which are relevant for HPC at the date of this DWMP are set out below, with the specification of each category included in Appendix 1:

- Very Low Level Waste (VLLW) - A sub-set of LLW.
- Low Level Waste (LLW)
- Intermediate Level Waste (ILW).

A number of radioactive waste forms are generated and treated throughout the operating life of the EPR. The main waste streams include:

- Ion exchange resins (used to minimise soluble radioactive material and which arise as either ILW or LLW dependent on the system in which they are used);
- Spent filters (used to remove particulate from liquid and ventilation systems, and may be ILW or LLW dependent on the system from which they arise);
- Dry active waste and metals (generated through routine and maintenance operations throughout the Nuclear Island; small components may be ILW, but mainly arises as LLW);
- Tank sludge (arises as particulates settle out in tanks from liquid waste treatment systems and is expected to be ILW or LLW);
- Evaporator concentrates (arise from evaporation for the minimisation of radioactive liquid effluents and is expected to be LLW).

The waste streams and processes employed for their management are set out in detail in the supporting DDWMP Chapter 12.

With the exception of ILW disposal, all Operational Waste Management activities take place throughout generation, and continue for a period after EoG, with the facilities also continuing in use. The activities before EoG are classified as Technical Matters, with the costs falling to operational revenue, while those after EoG are Designated Technical Matters.

This activity covers the retrieval, processing and packaging of the remaining wastes generated during the operational period together with similar wastes produced during the early stages of decommissioning. The overall activities may be summarised as follows:

- Packaging and disposal of Low Level Waste after end of generation
- Retrieval and packaging of Intermediate Level Waste after end of generation
- Operation and emptying of the Intermediate Level Waste Store and disposal of Intermediate Level Waste
- Decommissioning of the Intermediate Level Waste Store

Radioactive wastes with similar characteristics to those produced during operation will be generated during the early years of decommissioning. It is conservatively assumed that all waste streams continue at operational levels for a period of five years after EoG.

Waste retrieval, processing and storage facilities will be provided early in the station's operational lifetime to facilitate this process. The ILWISF will be provided on site to store ILW arising from operations from an early point in the operational period of the station. The construction and operation of the facility prior to EoG is a Technical Matter.

In alignment with the FDP Guidance Base Case assumptions, packaged LLW arising during operations will be disposed to an authorised disposal facility as soon as reasonably practicable. The packaged ILW will be placed in the ILWISF awaiting the availability of the GDF to take the wastes. These activities are Technical Matters and will be funded via operating revenue. Wastes arising from the final two years of generation are assumed to be still in the plant and will be managed after EoG as will the subsequent five years of operational type wastes. These are classified as Designated Technical Matters.

As station decommissioning progresses and less quantities of active liquid effluent are being generated, the liquid waste treatment system will be taken out of service. It is currently assumed that a Mobile Active Effluent Treatment Plant (MAETP) will be utilised to treat the remaining quantities of active liquid effluent being generated. This plant is assumed to be installed in the Decommissioning Waste Management Facility (DWMF), where it treats the liquid effluent generated by this facility. It is assumed that the small volumes of liquid effluent arising during the latter stages of decommissioning, immediately prior to decommissioning of the Waste & Effluent Building adjacent to Unit 1, will be transported to the MAETP by tanker.

The accumulation facilities for raw operational ILW and LLW storage have been sized appropriately for a strategy of prompt processing of the wastes on a regular basis. This strategy meets the Office of Nuclear Regulation (ONR) expectations for minimising the volume of unconditioned "raw" waste stored on site, and NNB GenCo's strategy for prompt conditioning of waste that will be disposed of as ILW. It is assumed for planning purposes that such a campaign takes place up to two years before EoG, leaving no wastes in the accumulation facilities. The retrieval, processing and packaging of wastes arising in the final two years will be dealt with after EoG so the resulting costs and the cost of managing the wastes arising during the five years after EoG are considered to be Designated Technical Matters.

4.4.1 Operational LLW Packaging and Disposal After EoG

EPRWBS:

Unit 1: 1.HPC.U1.03.005.010 – LLW Operational Waste

Unit 2: 1.HPC.U2.03.005.010 – LLW Operational Waste

EPRCRS:

Unit 1: 01.01.02.01.02.02.01 – Operational LLW retrieval, processing, packaging, transport - T60-T65

01.01.02.01.02.02.02 – Operational LLW disposal – T60-T65

Unit 2: 01.01.02.02.02.02.01 – Operational LLW retrieval, processing, packaging, transport - T60-T65

01.01.02.02.02.02.02 – Operational LLW disposal – T60-T65

Following EoG, the packaged LLW will be transferred for treatment or disposal to an appropriately permitted facility as soon as practicable. It is assumed that a disposal route for solid LLW will be available throughout the station's operational and decommissioning periods, and that following treatment, residual operational and decommissioning waste will be packaged and disposed of to this facility, consistent with current arrangements for the use of the Low Level Waste Repository. It is conservatively assumed that the Operational LLW which remains in the operational

plant at EoG is equivalent to two years operational arisings, and that this is managed after EoG. The management and disposal of all operational LLW after EoG is a Designated Technical Matter.

4.4.2 Operational ILW Retrieval and Packaging after EoG

EPRWBS:

Unit 1: 1.HPC.U1.03.005.005 – Unit 1 ILW Operational Waste

Unit 2: 1.HPC.U2.03.005.005 – Unit 2 ILW Operational Waste

EPRCRS:

Unit 1: 01.01.02.01.03.01.00 – Unit 1 Operational ILW retrieval processing and packaging after EoG for a period of 5 years

Unit 2: 01.01.02.02.03.01.00 – Unit 2 Operational ILW retrieval processing and packaging after EoG for a period of 5 years

The ILW will be retrieved and packaged into containers suitable for initial surface storage in the ILWISF, followed by disposal at the GDF. The Radioactive Waste Management Directorate (RWMD) has been provided with a disposability assessment for the packaged wastes as part of the Generic Design Assessment (GDA) and has confirmed that they are likely to be acceptable, subject to further development and assessment under the Letter of Compliance (LoC) process.

The timing of the transfer of title to and liability for ILW to Government will be determined under the WTC. It has been assumed that a disposal route for ILW from HPC will be available when required (currently assumed to be 2083). This is a deviation from the FDP Guidance Base Case assumption, which is that ILW arising from operations and decommissioning will be stored in safe and secure interim storage facilities on the site of the power station, pending disposal. The DWMP assumption will be subject to revision in the event that GDF is not available as currently assumed. It has been assumed in the DWMP that ILW is required to be stored on site throughout the operational period, but that the disposal route will be available after EoG. It is conservatively assumed that the Operational ILW which remains in the operational plant at EoG is equivalent to two years operational arisings, and that this is managed after EoG. Management of all of these waste streams after EoG is a Designated Technical Matter.

4.4.3 Operation and Emptying the ILWISF and Disposal of Packaged ILW

EPRWBS:
Common: 1.HPC.Com.03.020.015 – ILWISF Store Emptying

EPRCRS:
Common: 01.01.02.09.03.02.00 - Operation and Emptying

01.01.02.09.03.03.00 - ILW Transport

01.01.02.09.03.04.00 - ILW Disposal

Packaged operational wastes will continue to be stored on site throughout the operational period in the ILWISF, and the store will be emptied and decommissioned early in the decommissioning period of the station. The ILWISF will be designed for a 100 year lifetime, and could continue to store operational ILW during the decommissioning period in the event of delayed availability of an ILW disposal route. However additional storage capacity would need to be constructed in the event that onsite interim storage of decommissioning ILW was required.

Once the GDF becomes available to take the wastes, the ILWISF will be emptied and the packaged wastes transported to the GDF.

The costs associated with ILWISF operation after EoG, emptying and the subsequent transport of the wastes to and disposal of packaged wastes at the GDF are Designated Technical Matters.

The operational ILW transport and disposal costs are estimated by utilising the current estimated lifetime volume of packaged operational ILW in the ISFS and simply multiplying this by the transport rate per mile and the disposal rate per cubic metre currently provided by DECC The current estimate of the waste volumes basis of the estimates is further detailed in the supporting DDWMP Chapter 12 and Chapter 18, Section 18.2.2.4.

It should be noted that the package numbers and volume assumed for the purposes of calculating a disposal cost do not consider the impact of radionuclide decay during storage; these package numbers are therefore considered bounding and associated costs are conservative. Initial calculations performed within GDA suggest that a significant proportion of packages could be re-categorised as LLW following interim storage.

4.4.4 ILWISF Decommissioning

EPRWBS:

Common: 1.HPC.Com.03.020.020 – ILWISF Decom. and Demolition

EPRCRS:

Common: 01.01.02.09.01.02.03 – Decommissioning Processes / Operations

Once emptied of packaged waste, the ILWISF will be decommissioned and demolished. All operational systems will be made safe and a full radiological survey undertaken. It is assumed that the facility will be uncontaminated, thus requiring only the safe employment of conventional deplanting and demolition methods. The decommissioning of the ILWISF is a Designated Technical Matter.

4.5 PLANT AND BUILDING DECOMMISSIONING AND MANAGEMENT OF DECOMMISSIONING WASTES - ACTIVITY 04

This activity covers the complete decommissioning of all plant, equipment, buildings and facilities at the power station site, with the exception of the ISFS, and the management of the radioactive, hazardous and clean wastes arising from the process. The Activity includes all of the permanent building and facilities on the site indicated on the Site Plan. It is assumed that the construction facilities will be removed following completion of construction at the site. The overall activities may be summarised as follows:

- Nuclear Island decommissioning
    - Construction of Decommissioning Waste Management Facility
    - Reactor building decommissioning
    - Fuel building decommissioning
    - Auxiliary building decommissioning
    - Safeguards building decommissioning
    - Access building decommissioning
    - Waste and effluent building decommissioning
    - Balance of nuclear island decommissioning
- Conventional Island decommissioning
    - Turbine hall decommissioning
    - Cooling water system decommissioning
    - Balance of Conventional island decommissioning

A number of activities will have already been carried out in preparation for plant and reactor decommissioning as part of Site Operation and Plant Preparations - Activity 02. These include the making safe and isolation, draining and/or venting of redundant plant and equipment by site staff prior to its decommissioning. Primary Circuit Decontamination, and the provision of new electrical systems and effluent treatment systems for the decommissioning of HPC, will also have been carried out as part of Activity 02. There may however be a residual radiological, chemical or other hazard which must be addressed during the decommissioning process. Before decommissioning commences, the area will be surveyed for hazards and the necessary removal works put in place. Hazardous materials will be removed at the earliest opportunity to minimise risks to staff. Any lagging materials, radiological hotspots and any oils or chemicals remaining will be dealt with before general deplanting operations are initiated. Methodologies, equipment and techniques will be carefully selected to ensure that decommissioning is carried out safely, to minimise environmental impact, and to minimise risks to staff, programme and costs.

All structures, roads, hard standings, cable and pipe trenches etc will be removed to a metre below ground level, this being in alignment with demolition industry guidance and existing practice at nuclear power stations undergoing decommissioning. This is considered to be in line with the FDP Guidance Base Case assumption that that the site is restored to a state similar to “Greenfield” or its state prior to construction. During the dismantling and demolition of the site, various underground structures will become redundant. For instance there are extensive tunnels, culverts and pipework associated with the CW System and technical galleries, site drainage pipelines and associated chambers throughout the site. These will be backfilled with suitable fill material or a liquidised grout to prevent collapse. Basements will be punctured to permit free flow of groundwater, and will be backfilled with suitable fill material originated on site from building demolition, supplemented with imported material.

The following sub-sections describe the work to be undertaken to decommission the Nuclear Island, Conventional Island and Balance of Plant. The decommissioning of all facilities and the management and disposal of all waste arisings are Designated Technical Matters unless otherwise stated.

4.5.1 Quantities of Hazardous Waste resulting from Decommissioning

Decommissioning of the facilities set out in the following sections will give rise to hazardous wastes. The packaged volume of ILW, LLW and VLLW are summarised in Table below. The source of the data is presented in detail in the DDWMP Chapter 13, Tables 13-1 to 13-7.

	ILW m^3	LLW m3	VLLW m3
Primary Waste[3]	1979	3213	7230
Secondary Waste[4]	0	747	4199

Table 1: Decommissioning Packaged Waste Volume (per EPR Unit)

4.5.2 Nuclear Island Decommissioning

EPRWBS:

Common: 1.HPC.COM.04.005 – Nuclear Island Decommissioning

Unit 1: 1.HPC.U1.04.005 – Nuclear Island Decommissioning

Unit 2: 1.HPC.U2.04.005 – Nuclear Island Decommissioning

EPRCRS:

Unit 1: 01.01.02.01.02.03 – Decommissioning Processes / Operations

Unit 2: 01.01.02.02.02.03 – Decommissioning Processes / Operations

Common: 01.01.02.09.02.03 – Decommissioning Processes / Operations

For the purpose of this report, the Nuclear Island is taken to include all plant, equipment and the buildings which present a radiological hazard during decommissioning. The Nuclear Island is therefore taken to include the systems, plant, equipment, facilities and the buildings containing them:

- Reactor Building, including Primary Circuit and reactor and Nuclear Steam Supply System (NSSS);
- Fuel Building;
- Auxiliary Building;

[3] Primary decommissioning waste refers to waste generated during dismantling activities. Primary waste will include plant system components, such as the pressure vessel and associated internal components, primary circuits, steam generators and the concrete shield that surround the vessels. Typically, primary waste consists of construction materials, such as steel and reinforced concrete.

[4] Secondary waste refers to waste generated during various decontamination and dismantling activities, e.g. decontamination of metallic components or flushing of systems to reduce the amount of primary waste. Secondary waste consists of liquid waste, spent ion exchange resins, spent filters, and dry active waste.

- Safeguards Buildings;
- Access Building;
- Waste Management Buildings;
- Balance of Nuclear Island (BNI);
- ILWISF;
- ISFS.

While the ILWISF and the ISFS are part of the Nuclear Island, their decommissioning is included in Management of Operational Wastes (Activity 03) and Fuel Management (Activity 01) respectively.

The buildings and facilities listed above house systems comprising large quantities of tanks, pipework, valves, heat exchangers, ventilation ducts, fans, filters, pumps, etc which are internally radioactively contaminated, requiring the use of radiological precautions and working methods appropriate for the hazard each presents. Each also contains a significant amount of similar plant, equipment and services plus many motors, sensors, electrical panels, cable trays, cables etc which have no radiological hazard associated with them. Following confirmation by radiological monitoring, appropriate working methods and precautions will be employed to ensure that the dose to the workforce is ALARP.

Once deplanting of the Nuclear Island buildings has been completed, the rooms can be decontaminated followed by monitoring and release from radiological control.

The scope of work includes radiological surveys, removal and dismantling of equipment, with size reduction where necessary, decontamination of the building structure and fabric and waste classification, size reduction, processing and packaging. Recycling of materials will be employed where possible, and following treatment to minimise the volume, wastes will be disposed of to appropriate licensed sites. Completion of decontamination permits the demolition of the Nuclear Island buildings by conventional demolition methods.

The buildings which comprise the Nuclear Island are primarily concrete structures. The scope of work, following the completion of removal of all plant equipment and services will include:

- Decontamination and clearance monitoring;
- Demolition;
- Radiological and chemical monitoring of any building rubble generated from the demolition of these buildings, with crushing and grading of uncontaminated, inert material as infill for basements and voids on the site;
- Recycling or disposal of wastes off-site.

The strategy for the main components of the Primary Circuit e.g. Steam Generators & Pressuriser, is to remove them intact from their operational location, and to cut them up and package the wastes in an on-site dedicated facility. This facility will also process, assay and package the radioactive decommissioning wastes arising from the decommissioning of both units. This facility is called the DWMF.

4.5.2.1 Decommissioning and Decommissioning Waste Management Facility (DWMF)

EPRWBS:

Common: 1.HPC.Com.04.010.005.115 – Decom. Waste Management Facility

EPRCRS:

Unit 1: 01.01.02.01.02.03.01 – Decommissioning LLW Processing/Packaging

01.01.02.01.03.05.00 – Conditioning/Packaging of Decom. ILW

Unit 2: 01.01.02.02.02.03.01 – Decommissioning LLW Processing/Packaging

01.01.02.02.03.05.00 – Conditioning/Packaging of Decom. ILW

Common: 01.01.02.09.01.01.00 – New Construction for Decommissioning

Following deplanting and backfilling of Unit 1 Turbine Hall, (see Section 4.5.3.1) it is converted into a DWMF for:

- Processing of Primary Circuit and other large components requiring radiological precautions.
- Receipt and buffer storage of raw LLW and ILW.
- Further processing of LLW and ILW as necessary.
- Assay, packaging and buffer storage of packaged waste for disposal.

The civil works will include the construction of a new floor in the backfilled Turbine Hall to support the loads associated with the handling and storage of the large components and construction and installation of shielded containment structures and facilities for processing ILW and LLW. The design incorporates the necessary drainage and ventilation systems and will accommodate the MAETP for the processing of liquid effluent arisings.

The major components of the Primary Circuit, comprising the steam generators and pressuriser, will be transported to this facility as single units for size reduction. The facility incorporates buffer storage for receipt of these components, prior to their transfer via multi wheeled vehicle into the shielded size reduction facility. Size reduction will be undertaken remotely, with the size of residual components optimised to maximise the waste container packing efficiency. Waste components will be assayed and consigned for packaging into waste disposal boxes.

The facility includes waste box grouting facilities for these wastes and for those sent to the facility already boxed from the workface. Finally the facility incorporates waste disposal box dose measurement facilities and limited buffer storage prior to transfer of the ILW or LLW waste boxes to the appropriate disposal facility.

The design, construction operation and decommissioning of the facility is set out in detail in the DDWMP Chapter 13 Section 13.4.2.

The operations taking place within the DWMF will be designed such that they do not cause delays or bottlenecks to the dismantling process.

The DWMF will be decommissioned and demolished on completion of the processing of wastes from the Nuclear Island.

4.5.2.2 Reactor Building Decommissioning and Demolition

EPRWBS:
Unit 1: 1.HPC.U1.04.005.005 – Reactor Building

Unit 2: 1.HPC.U2.04.005.005 – Reactor Building

EPRCRS:
Unit 1: 01.01.02.01.01.12 – Decommissioning Processes / Operations
01.01.02.01.03 – Decommissioning ILW Transport
01.01.03.01.03 – Decommissioning ILW Disposal
01.01.02.01.02. – Decommissioning LLW Transport & Disposal

Unit 2: 01.01.02.02.01.12 – Decommissioning Processes / Operations
01.01.02.02.03 – Decommissioning ILW Transport
01.01.03.02.03 – Decommissioning ILW Disposal
01.01.02.02.02. – Decommissioning LLW Transport & Disposal

The main task within the reactor building is the decommissioning and dismantling of the Reactor Vessel, its internals and the Primary Circuit.

Decommissioning of the main Primary Circuit and reactor components will involve the following tasks:

- Chemical decontamination of the Reactor Coolant System (see Section 4.3);
- Removal of the Steam Generators and transfer to the DWMF for dismantling;
- Removal of the Pressuriser and transfer to the DWMF for dismantling;
- Dismantling of the Reactor Coolant Pumps;
- Dismantling of the Primary Circuit pipework;
- Dismantling of the Reactor Vessel and Internals;
- Dismantling of the other internal structures, including the In-Containment Refuelling Water Storage Tank and the Corium Recovery Area in the Reactor Building Basement Area;
- Decontamination and radiological clearance of all internal building surfaces.

Thermal insulation and cladding on the Primary Circuit will be removed to permit further dismantling tasks. This is may give rise to LLW, which, following radiological monitoring, will be consigned as appropriate for disposal.

The Primary Circuit components, other than the reactor, will be cut free of the connecting pipework etc and removed from their location. They will be transferred to the DWMF for subsequent dismantling and waste management, i.e. characterisation, size reduction, processing, and packaging of wastes prior to disposal off-site.

Removal of the major Primary Circuit and reactor components will not commence until the DWMF is completed and available to receive the components.

Reactor dismantling will commence with removal of the Reactor Head which will be placed into a transfer container to prevent spread of contamination and provide a degree of shielding during transfer to the DWMF. Dismantling of the reactor internals will be accomplished within the flooded Reactor Building Pool to provide radiological

shielding. The Reactor Vessel will be cut up within the Reactor Building Pool and packaged for transfer to the DWMF for further processing and packaging for disposal.

In addition to the major components of the Primary Circuit and reactor there are a number of other more minor components, including heat exchangers, tanks, valves, pipes, pumps, filters etc. Many of these may have been exposed to contaminated fluids and so could be radioactively contaminated. These will be removed and transferred to the DWMF for processing.

Following completion of removal of the Primary Circuit components, decommissioning will progress to the remainder of the plant and equipment within the Reactor building, with all plant items removed and radiologically monitored. Each item of plant will be cut into suitably sized segments, sentenced, treated and packaged appropriately, with wastes being transferred to the DWMF for further size reduction, processing and packaging prior to disposal.

The irradiated concrete of the reactor compartment (pit) will be removed in sections for transfer to the DWMF for processing and packaging.

All remaining structures will be decontaminated, dismantled and the radioactive wastes transferred to the DWMF where they will be segregated according to waste activity and waste type, processed and packaged appropriately for disposal.

Once the equipment and internal structures in the Reactor Building have been removed, the Reactor Building will be decontaminated as necessary followed by monitoring and release from radiological control and demolition.

The Reactor Building will be demolished to a depth of 1 m below ground and backfilled with uncontaminated inert building rubble generated from its demolition.

4.5.2.3 Fuel Building Decommissioning and Demolition

EPRWBS:

Unit 1: 1.HPC.U1.04.005.010 – Fuel Building Decommissioning

Unit 2: 1.HPC.U2.04.005.010 – Fuel Building Decommissioning

EPRCRS:

Unit 1: 01.01.02.01.01.12 – Decommissioning Processes / Operations

Unit 1: 01.01.02.01.02. – Decommissioning LLW Transport & Disposal

Unit 2: 01.01.02.02.01.12 – Decommissioning Processes / Operations

Unit 2: 01.01.02.02.02. – Decommissioning LLW Transport & Disposal

The Fuel Building houses the fuel storage pool and associated fuel handling facilities and support systems. The pool and its content will be radiologically contaminated, as are many of these systems, requiring the use of radiological precautions and working methods appropriate for the hazard each presents. The building also contains a significant amount of plant, equipment and services which have minimal or no radiological hazard associated with them. Following confirmation by radiological monitoring, appropriate working methods and precautions will be employed for their decommissioning.

The fuel pool and installed equipment will be decontaminated in situ as far as possible to reduce radiological exposure and minimise the potential for spread of contamination. The fuel racks and other equipment will be removed and, following monitoring, consigned to the appropriate waste stream for further processing and disposal.

The building contains quantities of tanks, pipework, valves, heat exchangers, ventilation ductwork, pumps, motors, sensors, electrical panels, cable trays, cables etc, that will be decommissioned and removed and, following monitoring, consigned to the appropriate waste stream for further processing & disposal. Waste materials which, following monitoring, are classified as “clean” (free from radiological concern) will be removed directly for further processing for recycling or disposal as appropriate. Radioactive wastes will be consigned to the DWMF for further processing, assay and packaging prior to off-site disposal to an appropriate licensed disposal site.

Once deplanting of the Fuel Building has been completed, the rooms can be decontaminated followed by radiological monitoring and release from radiological control. The building will then be demolished with the other NI buildings in a single campaign.

The Fuel Building will be demolished to a depth of 1 m below ground level and backfilled with uncontaminated inert building rubble generated from the demolition of the buildings, which has been monitored, crushed and graded for use as infill material for basement areas, supplemented as necessary with imported fill material.

4.5.2.4 Auxiliary Building Decommissioning and Demolition

EPRWBS:

Unit 1: 1.HPC.U1.04.005.010 – Auxiliary Building Decommissioning

Unit 2: 1.HPC.U2.04.005.010 – Auxiliary Building Decommissioning

EPRCRS:

Unit 1: 01.01.02.01.01.12 – Decommissioning Processes / Operations

01.01.02.01.02. – Decommissioning LLW Transport & Disposal

Unit 2: 01.01.02.02.01.12 – Decommissioning Processes / Operations

01.01.02.02.02. – Decommissioning LLW Transport & Disposal

The Auxiliary Building houses facilities and support systems for the Reactor Building and Fuel Building.

The building contains quantities of tanks, pipework, valves, heat exchangers, ventilation ductwork, pumps, motors, sensors, electrical panels, cable trays, cables etc, many of which may have been exposed to contaminated fluids and so will be radioactively contaminated. Following confirmation by radiological monitoring, appropriate working methods and precautions will be employed for their decommissioning. The plant and equipment will be decommissioned and removed, and, following monitoring, consigned to the appropriate waste stream for further processing and disposal. Waste materials which, following monitoring, are classified as “clean” (free from radiological concern) will be removed directly for further processing for recycling or disposal as appropriate. Radiological wastes will be

consigned to the DWMF for further processing, assay and packaging prior to off-site disposal to an appropriate licensed disposal site.

Once deplanting of the Auxiliary Building has been completed, the rooms can be decontaminated followed by radiological monitoring and release from radiological control. The building will then be demolished with the other NI buildings in a single campaign.

The Auxiliary Building will be demolished to a depth of 1 m below ground level and backfilled with uncontaminated inert building rubble generated from the demolition of the buildings, which has been monitored, crushed and graded for use as infill material for basement areas, supplemented as necessary with imported fill material.

4.5.2.5 Safeguards Buildings Decommissioning and Demolition

EPRWBS:

Unit 1: 1.HPC.U1.04.005.010 – Safeguards Building Decommissioning

Unit 2: 1.HPC.U2.04.005.010 – Safeguards Building Decommissioning

EPRCRS:

Unit 1: 01.01.02.01.01.12 – Decommissioning Processes / Operations

Unit 1: 01.01.02.01.02. – Decommissioning LLW Transport & Disposal

Unit 2: 01.01.02.02.01.12 – Decommissioning Processes / Operations

Unit 2: 01.01.02.02.02. – Decommissioning LLW Transport & Disposal

The four Safeguards Buildings house the electrical and mechanical safety systems associated with the reactor.

The buildings contain quantities of tanks, pipework, valves, heat exchangers, ventilation ductwork, pumps, motors, sensors, electrical panels, cable trays, cables etc, many of which may have been exposed to contaminated fluids and so will be radioactively contaminated. Following confirmation by radiological monitoring, appropriate working methods and precautions will be employed for their decommissioning. The plant and equipment will be decommissioned and removed, and, following monitoring, consigned to the appropriate waste stream for further processing and disposal. Waste materials which, following monitoring, are classified as “clean” (free from radiological concern) will be removed directly for further processing for recycling or disposal as appropriate. Radiological wastes will be consigned to the DWMF for further processing, assay and packaging prior to off-site disposal to an appropriate licensed disposal site.

Once deplanting of the Safeguards Buildings has been completed, the rooms therein can be decontaminated followed by radiological monitoring and release from radiological control. The building will then be demolished with the other NI buildings in a single campaign.

The Safeguards Buildings will be demolished to a depth of 1 m below ground level and backfilled with uncontaminated inert building rubble generated from the demolition of the buildings, which has been monitored, crushed and graded for use as infill material for basement areas, supplemented as necessary with imported fill material.

4.5.2.6 Access Building Decommissioning and Demolition

EPRWBS:

Unit 1: 1.HPC.U1.04.005.040 – Access Building Decommissioning

Unit 2: 1.HPC.U2.04.005.040 – Access Building Decommissioning

EPRCRS:

Unit 1: 01.01.02.01.01.12 – Decommissioning Processes / Operations

Unit 1: 01.01.02.01.02. – Decommissioning LLW Transport & Disposal

Unit 2: 01.01.02.02.01.12 – Decommissioning Processes / Operations

Unit 2: 01.01.02.02.02. – Decommissioning LLW Transport & Disposal

The Access Building controls access into the main Nuclear Island complex, and contains the welfare and some office locations for staff in this area. The building is expected to be very largely radiologically clean.

The building is expected to contain small quantities of tanks, pipework, valves, heat exchangers, ventilation ductwork, pumps, motors, sensors, electrical panels, cable trays, cables etc, which are not expected to have been exposed to contaminated fluids and so will not be radioactively contaminated. Following confirmation by radiological monitoring, appropriate working methods and precautions will be employed for their decommissioning. The plant and equipment will be decommissioned and removed, and, following monitoring, consigned to the appropriate waste stream for further processing and disposal. Waste materials which, following monitoring, are classified as “clean” (free from radiological concern) will be removed directly for further processing for recycling or disposal as appropriate. Any radiological wastes, if present, will be consigned to the DWMF for further processing, assay and packaging prior to off-site disposal to an appropriate licensed disposal site.

Once deplanting of the Access Building has been completed, the rooms can be monitored to confirm that they are uncontaminated, and released from radiological control. The building will then be demolished with the other NI buildings in a single campaign.

The Access Building will be demolished to a depth of 1 m below ground level and backfilled with uncontaminated inert building rubble generated from the demolition of the building, which has been monitored, crushed and graded for use as infill material for basement areas, supplemented as necessary with imported fill material.

4.5.2.7 Waste and Effluent Buildings Decommissioning and Demolition

EPRWBS:

Unit 1/Common: 1.HPC.Comm.04.005.045. – Waste Processing & Storage Buildings Decommissioning at Unit 1

Unit 2: 1.HPC.U2.04.005.045 – Waste Building Decommissioning at Unit 2

EPRCRS:

Unit 1/Common: 01.01.02.09.01.12.03 – Decommissioning Processes / Operations

Unit 1/Common: 01.01.02.09.02. – Decommissioning LLW Transport & Disposal

Unit 2: 01.01.02.02.01.12.03 – Decommissioning Processes / Operations

Unit 2: 01.01.02.02.02. – Decommissioning LLW Transport & Disposal

The Waste Processing & Storage Buildings located adjacent to Reactor 1 contain the waste management facilities to serve both units. It has consequently been designated as a "common" facility for the purpose of the cost assessment. The Waste Building adjacent to Unit 2, serves only this Unit; its primary function being to facilitate the transfer of wastes to the Unit 1 Waste Processing and Storage Buildings.

The Waste and Effluent Building at Unit 1 contains the wet waste accumulation tanks & process facilities for the site, a location for the mobile ILW processing plant, and a conditioned waste buffer store. The Waste Building at Unit 2 is essentially a facility for placing liquid effluent cartridge filters into a transfer container for transfer to the Unit 1 Waste Processing Building, where they are processed.

The building contains quantities of tanks, pipework, valves, heat exchangers, ventilation ductwork, pumps, motors, sensors, electrical panels, cable trays, cables etc, many of which may have been exposed to contaminated fluids and so could be radioactively contaminated. Following confirmation by radiological monitoring, appropriate working methods and precautions will be employed for their decommissioning. The plant and equipment will be decommissioned and removed, and, following monitoring, consigned to the appropriate waste stream for further processing and disposal. Waste materials which, following monitoring, are classified as "clean" (free from radiological concern) will be removed directly for further processing for recycling or disposal as appropriate. Radiological wastes will be consigned to the DWMF for further processing, assay and packaging prior to off-site disposal to an appropriate licensed disposal site.

Once deplanting of the Waste and Effluent Buildings has been completed, the rooms therein can be decontaminated followed by radiological monitoring and release from radiological control. The building will then be demolished with the other NI buildings in a single campaign.

The Waste and Effluent Buildings will be demolished to a depth of 1 m below ground level and backfilled with uncontaminated inert building rubble generated from the demolition of the buildings, which has been monitored, crushed and graded for use as infill material for basement areas, supplemented as necessary with imported fill material.

4.5.2.8 Balance of Nuclear Island Plant and Equipment Decommissioning

EPRWBS:

Unit 1: 1.HPC.U1.04.005.035 – Other Nuclear Island Building
1.HPC.U1.04.005.050 – Back Up Diesels
1.HPC.U1.04.005.055 – Functional Simplification
1.HPC.U1.04.005.060 – New Works
1.HPC.U1.04.005.065 – Dismantling Preparation
1.HPC.U1.04.005.070 – Nuclear Island Demolition Support
1.HPC.U1.04.005.075 – Nuclear Island Dismantling Secondary Wastes

Unit 2: 1.HPC.U2.04.005.035 – Other Nuclear Island Buildings
1.HPC.U2.04.005.050 – Back Up Diesels
1.HPC.U2.04.005.055 – Functional Simplification
1.HPC.U2.04.005.060 – New Works
1.HPC.U2.04.005.065 – Dismantling Preparation
1.HPC.U2.04.005.070 – Nuclear Island Demolition Support
1.HPC.U2.04.005.075 – Nuclear Island Dismantling Secondary Wastes

EPRCRS:

Unit 1: 01.01.02.01.01.12 – Decommissioning Processes / Operations
01.01.02.01.02 – Decommissioning LLW Transport & Disposal

Unit 2: 01.01.02.02.01.12 – Decommissioning Processes / Operations
01.01.02.02.02 – Decommissioning LLW Transport & Disposal

This group of tasks and associated costs draws together the work associated with the decommissioning of the remaining minor Nuclear Island facilities, the supporting and enabling works, and the secondary wastes arising.

Other Nuclear Island Buildings

This includes the decommissioning and waste management associated with the remaining minor Nuclear Island facilities on the site. Many will include contaminated systems, requiring appropriate radiological precautions during their decommissioning and subsequent waste management.

Back Up Diesels

This includes the decommissioning of the two Emergency Diesel Buildings associated with each Unit. These facilities will be radiologically clean, so deplanting will require only conventional safety measures, and the plant could be sold as scrap.

Functional Simplification

This task addresses the modification and simplification of the electrical systems, ventilation systems, environment and fire surveillance systems, and changes to the effluent management to simplify them as appropriate as decommissioning progresses.

New Works

The work addressed under this heading includes the refit of some electrical systems to make them fit for purpose, terminating on the new electrical distribution system discussed previously under Activity 2, changes to site access roads and the on-site road layout to accommodate changed requirements during decommissioning, and establishment of an interim waste storage area on the site.

Dismantling Preparation

This task includes the work required to remove the lagging from the Nuclear Island systems, excluding the Primary Circuit and NSSS, in preparation for its decommissioning, and the specific task of emptying tanks and systems which are designed, for safety reasons, not to be drained under normal circumstances.

Nuclear Island Demolition Support

The work here includes the establishment of contamination control areas including erection of tents and temporary barriers, as part of the radiological control measures to contain surface and airborne contamination during decommissioning.

Nuclear Island Dismantling Secondary Wastes

This task covers the transport and disposal of secondary VLLW and LLW arisings resulting from the decommissioning works.

4.5.3 Conventional Island Decommissioning

EPRWBS:

Common: 1.HPC.COM.04.10 – Conventional Island

Unit 1: 1.HPC.U1.04.10 – Conventional Island

Unit 2: 1.HPC.U2.04.10 – Conventional Island

EPRCRS:

Unit 1: 01.01.02.01.01.12.03 – Decommissioning Processes / Operations

Unit 2: 01.01.02.02.01.12.03 – Decommissioning Processes / Operations

Common: 01.01.02.09.01.12.03 – Decommissioning Processes / Operations

For the purpose of this Plan, the Conventional Plant or Conventional Island is taken to include all plant, equipment and the buildings which are associated with power generation or the operation of the site and which do not present a radiological hazard. The Conventional Island for each unit is therefore taken to include the systems, plant, equipment, facilities and buildings listed below, with some shared facilities as noted:

- Turbine Hall;

- Generator Switchgear & Main Transformers;
- CW Pumphouse/Forebay;
- CW Intake Structures;
- CW Outfall Structures, Tunnels and Outfall (Shared);
- Balance of Conventional Island including all power generation plant; ancillary plant and offices and welfare facilities (Shared);
- Substation & On-site Transmission Towers (Shared).

Decommissioning of the Conventional Island is based upon the knowledge of design and layout of the plant and equipment at the time of preparation of this DWMP, utilising current proven techniques for dismantling, demolition and waste management, in accordance with prevailing regulations, international guidance and best practice.

A number of activities necessary for Conventional Island decommissioning will already have been carried out as part of Activity 2 Site Operation and Plant Preparations. These include the isolation and making safe of redundant mechanical and electrical systems and the removal of potentially mobile hazardous materials such as oils, chemicals and combustible materials. Plant systems and buildings will have been maintained in a stable condition to permit safe access for dismantling activities and all redundant site infrastructure services will have been made safe for removal with decommissioning supplies made available as necessary.

The scope of work will include:

- All redundant buildings, structures, plant and systems within the Non-Controlled Areas of the power station will be demolished to one metre below ground level;
- The CW System will be permanently sealed, with on shore sections of tunnels and culverts filled to prevent the possibility of flooding through the redundant buried structures when site demolition is complete;
- Structural basements, voids, service tunnels, cable and pipe trenches will be penetrated to allow free movement of ground water and backfilled with suitable materials after removal of all plant and equipment;
- Plant decommissioning includes removal of the site infrastructure, roads, car parks, hard standings, fences, underground cables and services;
- On completion of all demolition and site clearance operations the station areas will be reinstated. Sub soil and top soil will be used and the site will be graded to match existing ground levels;
- All dismantling and demolition materials and waste will have been recycled or disposed of to licensed facilities, or where practicable, utilised to backfill basements.

All work and associated waste disposal are assigned as Designated Technical Matters.

Hazardous Waste Management

Drainage and service pipes or ducts may have varying types and levels of contamination including oil, chemicals or sewage. In addition, foundation areas below oil-filled plant or oil/chemical storage may have become contaminated over a period of time. Surveys will identify the risk prior to demolition activities and the areas will be monitored as buildings and plant items are removed. The contaminants will be assessed for methods, risks and disposal requirements using BAT. The hazardous waste will be removed to a registered and licensed facility.

Pipework in buildings and trenches and external tanks may be insulated with Man Made Mineral Fibre (MMMF) materials. MMMF, unlike asbestos, is not a hazardous waste. However, it can cause irritation of the skin and eyes and, in uncontrolled excessively dusty conditions, may irritate the upper respiratory tract. These symptoms are generally caused by exposure to coarse fibres. Control methods will be adopted to protect all personnel from such exposure.

The management of hazardous waste is a Designated Technical Matter.

Waste Processing and Disposal

During decommissioning of the Conventional Island, plant dismantling and building demolition will produce quantities of waste materials. These will be processed for recycling or disposal.

Generally, demolition materials will be recycled or disposed as follows:

- All metals from plant dismantling will be processed for recycling and disposal as scrap materials;
- Clean inert demolition arisings of brick rubble and concrete will be processed as suitable backfill material and incorporated into the works where possible;
- Hazardous waste materials, insulants, oil or chemicals and contaminated ground will be packaged and disposed to registered and licensed waste disposal facilities;
- All non-hazardous general waste materials which cannot be recycled will be separated and disposed to appropriate registered and licensed waste disposal facilities.

All waste processing and disposal tasks are Designated Technical Matters, with the cost of disposal, or scrap credit where appropriate, included within the overall cost in each of the following sections.

4.5.3.1 Turbine Hall Decommissioning

EPRWBS:

Unit 1: 1.HPC.U1.04.010.005 – Turbine Hall Unit 1

Unit 2: 1.HPC.U2.04.010.005 – Turbine Hall Unit 2

EPRCRS:

Unit 1: 01.01.02.01.01.12.03 – Decommissioning Processes / Operations

Unit 2: 01.01.02.02.01.12.03 – Decommissioning Processes / Operations

Each EPR Unit has its own identical Turbine Hall, housing its turbo-alternator and associated ancillary plant. The strategy employed at the site is to deplant Unit 1 Turbine hall, to backfill its basement and to convert the building into a DWMF for the dismantling of the steam generators and pressurisers from both reactors, the packaging/grouting of LLW and ILW, and the buffer storage of both raw and packaged wastes.

The deplanting and backfilling methodology employed will be the same for each unit, though they will be at least 18 months apart. The Unit 2 Turbine Hall will be completely dismantled with the removal of the overhead cranes and demolition of the building superstructure.

The overall scope of work is:

- Turbo-Alternator deplanting;
- Turbine Hall Balance of Plant removal;
- Turbine Hall Basement backfilling;
- Turbine Hall Superstructure demolition;

4.5.3.2 Cooling Water (CW) System Plant & Equipment Decommissioning

EPRWBS:

Unit 1: 1.HPC.U1.04.015.005 – CW System

Unit 2: 1.HPC.U2.04.015.005 – CW System

Common: 1.HPC.Com.04.015.005 – CW System

EPRCRS:

Unit 1: 01.01.02.01.01.12.03 – Decommissioning Processes / Operations

Unit 2: 01.01.02.02.01.12.03 – Decommissioning Processes / Operations

Common: 01.01.02.09.01.12.03 - Decommissioning Processes / Operations

The existing gates and/or plugs for operational isolation of the CW System will be installed to isolate the various sections of the system. Large submersible pumps will be utilised to pump out the water contained within the system and return it to the sea. Once the sealing operations are completed, backfilling of the on-shore sections of the culverts to form a permanent isolation will commence and deplanting of the forebay and pumphouse can be carried out.

The overall scope of work is:

- Isolation of the sections of the system using the existing gates and/or plugs;
- Pumping out of residual water in the system to sea;
- Backfilling of the on shore sections of the culverts to form a permanent isolation;
- Deplanting of the Forebay and Pumphouse.

Each Unit has its own identical dedicated Forebay, which contains chambers with a depth of approximately 30 metres.

The scope of work is:

- Removal of the Debris Screens;
- Puncturing of the base of the Forebay Chamber and backfilling;
- Removal of plant and equipment from the Filter Debris Recovery Pit;
- Puncturing of the base of the Filter Debris Recovery Pit, demolition of the structure to 1 m below ground level and backfilling with inert, uncontaminated material;
- Transfer of redundant plant and equipment off-site for recycling.

Each Unit has its own identical dedicated Pumphouse. This is a large void with a depth of approximately 30m. The scope of work is:

- Electrical and mechanical disconnection of the main CW Pump motors, gearboxes and pump bodies;
- Removal of CW and Emergency CW Pumps and equipment using the existing overhead crane;
- Removal of pipework;
- Demolition of Pumphouse superstructure and walls;
- Removal of Overhead Crane;
- Backfilling of Pump Chambers with suitable inert, uncontaminated material;
- Transfer of redundant plant and equipment off-site for recycling.

Each unit is served by two CW intake structures and by a single common outfall structure. These structures are permanently submerged.

The scope of work is:

- Demolition of the CW Intake Structures to sea bed level;
- Demolition of the CW Outfall Structure to sea bed level;
- Removal of materials for recycling or disposal;
- Removal of demolition wastes for disposal off-site.

4.5.3.3 Balance of Conventional Island

EPRWBS:

Unit 1: 1.HPC.U1.04.015.010 – Other Balance of Plant

Unit 2: 1.HPC.U2.04.015.010 – Other Balance of Plant

Common: 1.HPC.Com.04.015.010 – Other Balance of Plant

EPRCRS:

Unit 1: 01.01.02.01.01.12.03 – Decommissioning Processes / Operations

Unit 2: 01.01.02.02.01.12.03 – Decommissioning Processes / Operations

Common: 01.01.02.09.01.12.03 – Decommissioning Processes / Operations

The Balance of Conventional Island includes the ancillary buildings, plant, equipment and facilities supporting the operation of each unit, and the common facilities such as workshops, offices, welfare and other miscellaneous buildings and facilities on the site. All remaining facilities will be made safe in readiness for deplanting and demolition when they are no longer required. The scope of work for decommissioning is:

- Removal of fixtures, fittings, services and temporary structures (known as “soft-strip”);
- Demolition of buildings and removal of structures to a depth of 1 m below ground;
- Backfilling of demolition voids with inert, uncontaminated material;
- Removal of roads, hard standings, pipe and cable trenches;
- Grouting of on-shore pipes, culverts, tunnels, manholes and chambers.

A new substation will be located to the South East corner of the site. Each unit is connected to the substation by overhead lines carried on transmission towers. It is anticipated that the substation will be owned and operated by National Grid, with the land leased from NNB GenCo. Consequently most of the liability associated with the substation will reside with the National Grid. The substation equipment includes sulphur hexafluoride (SF_6) insulated metal clad switchgear. The decommissioning liabilities for NNB GenCo are the circuits relating to the two Generator circuits and two Station Transformer circuits to the substation. This includes four circuit breaker bays and their associated equipment and the associated relay and control systems. The equipment that is the liability of NNB GenCo will be made safe as part of Site Operations and Plant Preparation - Activity 02.

The scope of work is:

- Dismantling of the transmission towers;
- Removal and transfer off-site of the sulphur hexafluoride insulation from the switchgear for appropriate processing and disposal;
- Dismantling of the circuit breaker equipment and associated relay and control systems;
- Demolition of the circuit breaker bays to a depth of 1 m below ground level and backfilling with inert, uncontaminated material;
- Removal of redundant plant and equipment off-site for recycling;
- Removal of waste off-site for recycling or disposal.

4.6 SITE CLEARANCE AND RELEASE FOR RE-USE – ACTIVITY 05

This activity covers the completion of the decommissioning process and the eventual and complete radiological clearance and delicensing of the site.

Site clearance monitoring, remediation and landscaping will be undertaken in two phases. The first and largest phase will be undertaken following completion of the decommissioning of the power station plant and ILWISF. At this stage the ISFS will still be operational. The second phase will be undertaken on completion of emptying and decommissioning of this facility. The overall activities may be summarised as follows:

- Final Site Delicensing
- Environmental management

4.6.1 Final Site Delicensing

EPRWBS:

Common: 1.HPC.Com.05.010 – Final Site Delicensing

EPRCRS:

Common: 01.01.02.09.01.12.03 – Decommissioning Processes / Operations

It is assumed for liabilities estimation purposes that the area occupied by the ISFS and its supporting facilities is relicensed, and that the major site area previously occupied by the now decommissioned power generating plant and its supporting facilities are delicensed on completion of the necessary surveys and clearances. Upon completion of fuel despatch and decommissioning of the ISFS, a radiological and chemical survey will be undertaken and any necessary remediation carried out. At this stage it is assumed for liabilities estimation purposes that this area of the site will be delicensed. The option is however retained to maintain both areas as nuclear licensed sites for re-use.

For each phase, the scope of work will be:

- Undertake an environmental monitoring programme to check for the presence of any residual radiological or chemical hazards on the area of site concerned;
- Undertake ground remediation work if necessary;
- Clearance surveys (also known as validation surveys) to check that all radioactive materials of regulatory concern have been removed from the site and that the site meets the agreed criteria for delicensing.

For planning purposes it is assumed that the site is reused for industrial purposes but that landscaping of the site and return to grassland will be an interim measure. It is further assumed that the site will remain uncontaminated during it's operational life. Should an event occur which gives rise to contaminated land, the management strategy will be determined and any remediation cost included into the DWMP cost estimates. This assumption forms the basis for the clearance and delicensing cost estimate.

The works included under this part of the DWMP are:

- Surveys during decommissioning at locations adjacent to the site which are known to be unaffected by reactor operations and reactor dismantling to establish a local baseline;
- Undertake ground remediation work for any locations which have been identified as not meeting the clearance criteria;
- A final clearance survey to demonstrate that the levels of radioactivity on the site that still remain from the nuclear activities are below those that might present a danger;
- Preparation of the safety/delicensing documentation;
- Interfaces with the ONR and the Environment Agency;
- Facilitation of an ONR independent radiological survey of the site;

An important factor in site clearance will be the demonstration that the site has been cleared of all sources of radioactivity originating from the operation of the reactors on the site to below an appropriate level. It will be important to establish the existing baseline levels of radio-nuclides as radioactivity is already present in the environment in very small quantities as a result of natural background, the atmospheric testing of nuclear weapons and fallout from the Chernobyl reactor accident. Radiological and chemical survey data is being obtained as part of the site construction works. This data will from the baseline for the initial levels of the site.

The final stage of decommissioning is the removal of the nuclear licensing requirements from the site. This requires preparation of a safety submission known as a Delicensing Case to ONR. In order to delicense the site the ONR will need to establish that any residual activity on the site represents "no danger". Once the criterion for "no danger" is met, the ONR will be able to delicense all or part of the site, thus ending the licensee's period of responsibility.

The Health and Safety Executive has stated that requiring a licensee to demonstrate 'no danger' cannot mean asking the licensee to demonstrate that the site is 'completely safe' (Ref. 6). Rather they require a demonstration that the radiological hazard will not pose a significant ongoing risk regardless of the future site use. The broadly acceptable level of risk to a member of the public, which is used by the ONR as the minimum requirement of "no danger", is the possibility of a fatality of one in a million per year.

However, the ONR expectation is that this criterion should be supplemented by the ALARP principle. This means that in making an application for delicensing all or part of the site, the licensee should demonstrate that all reasonably practicable actions have been taken to reduce the residual risk below one in a million per year. The application of the "no danger" risk criterion is consistent with the approach outlined in ONR's "The Tolerability of Risk from Nuclear Power Stations" (Ref. 7) and "Reducing Risks, Protecting People" (Ref. 8) publications.

ONR will establish whether the "no danger" criterion has been met on the basis of:

- Evidence provided by the licensee;
- Its own independent assessment;
- Evidence provided by the Environment Agency.

4.6.2 Environmental Management

EPRWBS:

Common: 1.HPC.Com.05.200 – Environmental Management

EPRCRS:

Common: 01.01.02.09.01.12.03 – Decommissioning Processes / Operations

As part of the Pre-Closure Preparations (Activity 0) a full Environmental Impact Assessment will be conducted in order to obtain consent to decommission the power station from the ONR under the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations. In addition it is likely that a variety of consents will be required for other works on site including importation of soils and soil making materials; possible use of soil ameliorants, drainage outfalls etc. The Environmental Impact Assessment process will require significant consultation with statutory and non statutory bodies including the Local Planning Authority, Environment Agency, Department of the Environment, Food and Rural Affairs, Forestry Authority, Natural England, Wildlife groups and parish councils and their views will need to be considered before reinstatement proposals can be finalised.

The current assumed final planned end use is for re-use as an industrial site but that landscaping of the site and return to grassland, similar to Greenfield, will be an interim measure.

It is assumed that the soil profile across the site will be reinstated to consist of 25 cm soil making material, 50 cm subsoil and 25 cm topsoil.

5 SITE SUMMARY LEVEL SCHEDULE

Many of the key buildings and facilities on the site are dedicated specifically to either Unit 1 or Unit 2, with a number of services, other facilities and buildings providing support to both units. The latter, along with site based activities, services and facilities are designated as “common”.

This segregation between Unit 1, Unit 2 and Common facilities is reflected in the Work Breakdown Structure, Summary Decommissioning Schedule and the decommissioning and waste management cost estimates. The summary level schedule presented in Figure 4, shows the segregation of the work into these three designations, with the Unit 1 section of the schedule followed by that for Unit 2, concluding with the Common section of the schedule.

The more extensive Common section of the schedule includes the work that is not specific to a single unit, such the Pre-Closure Planning, most of fuel management work, the site operational and overhead costs, and the corporate support.

Reference to the Gantt chart shows that the decommissioning plan is fully integrated across the site as shown by the overlap of work classified within these three designations.

This schedule is supported by the detailed schedule contained within the Detailed Decommissioning and Waste Management Plan, and is generated by summarising the same database within Primavera. Use of a consistent EPRWBS code facilitates clear linkage between scope, schedule and cost in both the DWMP and DDWMP.

For planning purposes, and subject to the terms of the Waste Transfer Contract and the actual construction and operational timescales for HPC, the following key dates and periods are assumed as the basis of the schedule and cost assessment included within this DWMP:

- Unit 1 EoG – 01st June 2083
- Unit 2 EoG – 30th November 2084
- Disposal Date for ILW – from 2083
- Fuel cooling period of final core after EoG – 55 years
- Transfer Date for spent fuel – May 2104*
- Disposal Date for spent fuel – from 2138

* The transfer date, and therefore the date on which activities begin to be categorised as Spent Fuel Management Costs, is taken to be the end of the year in which the scheduled transfer date falls, i.e. 31/12/2104.

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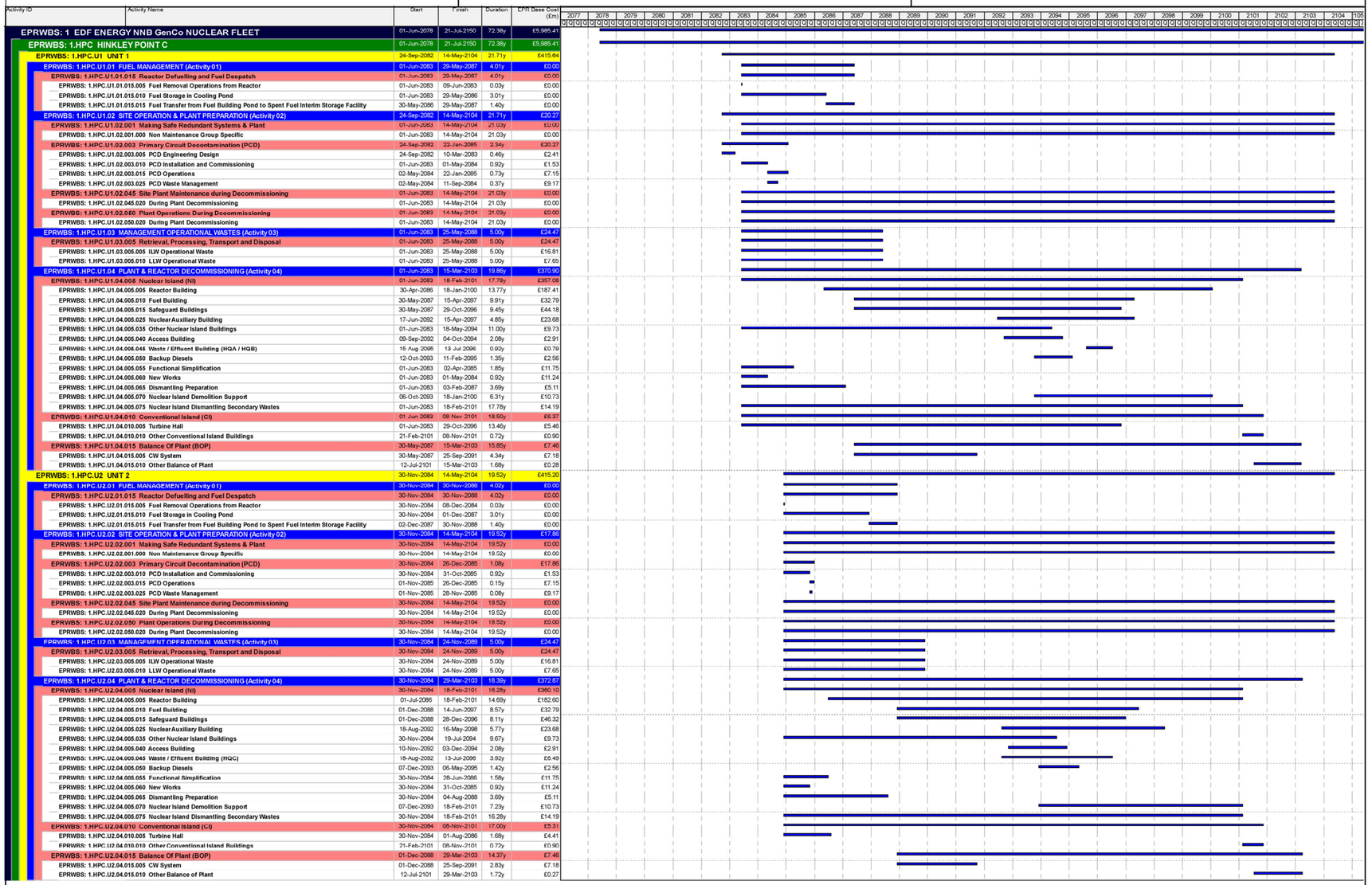
HPC Decommissioning and Waste Management Plan - Live Schedule
Schedule Dataset: May 2014

UK PROTECT - COMMERCIAL

HPC DWMP Rev 4.0 - Summary Schedule

Activity ID	Activity Name	Start	Finish	Duration	EPR Base Cost (£m)
EPRWBS: 1	EDF ENERGY NNB GenCo NUCLEAR FLEET	01-Jun-2078	21-Jul-2150	72.38y	£5,985.41
EPRWBS: 1.HPC	HINKLEY POINT C	01-Jun-2078	21-Jul-2150	72.38y	£5,985.41
EPRWBS: 1.HPC.U1	UNIT 1	24-Sep-2082	14-May-2104	21.71y	£415.64
EPRWBS: 1.HPC.U1.01	FUEL MANAGEMENT (Activity 01)	01-Jun-2083	29-May-2087	4.01y	£0.00
EPRWBS: 1.HPC.U1.01.015	Reactor Defuelling and Fuel Despatch	01-Jun-2083	29-May-2087	4.01y	£0.00
EPRWBS: 1.HPC.U1.01.015.005	Fuel Removal Operations from Reactor	01-Jun-2083	09-Jun-2083	0.03y	£0.00
EPRWBS: 1.HPC.U1.01.015.010	Fuel Storage in Cooling Pond	01-Jun-2083	29-May-2086	3.01y	£0.00
EPRWBS: 1.HPC.U1.01.015.015	Fuel Transfer from Fuel Building Pond to Spent Fuel Interim Storage Facility	30-May-2086	29-May-2087	1.40y	£0.00
EPRWBS: 1.HPC.U1.02	SITE OPERATION & PLANT PREPARATION (Activity 02)	24-Sep-2082	14-May-2104	21.71y	£20.27
EPRWBS: 1.HPC.U1.02.001	Making Safe Redundant Systems & Plant	01-Jun-2083	14-May-2104	21.03y	£0.00
EPRWBS: 1.HPC.U1.02.001.000	Non Maintenance Group Specific	01-Jun-2083	14-May-2104	21.03y	£0.00
EPRWBS: 1.HPC.U1.02.003	Primary Circuit Decontamination (PCD)	24-Sep-2082	22-Jan-2085	2.34y	£20.27
EPRWBS: 1.HPC.U1.02.003.005	PCD Engineering Design	24-Sep-2082	10-Mar-2083	0.46y	£2.41
EPRWBS: 1.HPC.U1.02.003.010	PCD Installation and Commissioning	01-Jun-2083	01-May-2084	0.92y	£1.53
EPRWBS: 1.HPC.U1.02.003.015	PCD Operations	02-May-2084	22-Jan-2085	0.73y	£7.15
EPRWBS: 1.HPC.U1.02.003.025	PCD Waste Management	02-May-2084	11-Sep-2084	0.37y	£9.17
EPRWBS: 1.HPC.U1.02.045	Site Plant Maintenance during Decommissioning	01-Jun-2083	14-May-2104	21.03y	£0.00
EPRWBS: 1.HPC.U1.02.045.020	During Plant Decommissioning	01-Jun-2083	14-May-2104	21.03y	£0.00
EPRWBS: 1.HPC.U1.02.050	Plant Operations During Decommissioning	01-Jun-2083	14-May-2104	21.03y	£0.00
EPRWBS: 1.HPC.U1.02.050.020	During Plant Decommissioning	01-Jun-2083	14-May-2104	21.03y	£0.00
EPRWBS: 1.HPC.U1.03	MANAGEMENT OPERATIONAL WASTES (Activity 03)	01-Jun-2083	25-May-2088	5.00y	£24.47
EPRWBS: 1.HPC.U1.03.005	Retrieval, Processing, Transport and Disposal	01-Jun-2083	25-May-2088	5.00y	£24.47
EPRWBS: 1.HPC.U1.03.005.005	ILW Operational Waste	01-Jun-2083	25-May-2088	5.00y	£16.81
EPRWBS: 1.HPC.U1.03.005.010	LLW Operational Waste	01-Jun-2083	25-May-2088	5.00y	£7.65
EPRWBS: 1.HPC.U1.04	PLANT & REACTOR DECOMMISSIONING (Activity 04)	01-Jun-2083	15-Mar-2103	19.86y	£370.90
EPRWBS: 1.HPC.U1.04.005	Nuclear Island (NI)	01-Jun-2083	18-Feb-2101	17.78y	£357.08
EPRWBS: 1.HPC.U1.04.005.005	Reactor Building	30-Apr-2086	18-Jan-2100	13.77y	£187.41
EPRWBS: 1.HPC.U1.04.005.010	Fuel Building	30-May-2087	15-Apr-2097	9.91y	£32.79
EPRWBS: 1.HPC.U1.04.005.015	Safeguard Buildings	30-May-2087	29-Oct-2096	9.45y	£44.18
EPRWBS: 1.HPC.U1.04.005.025	NuclearAuxiliary Building	17-Jun-2092	15-Apr-2097	4.85y	£23.68
EPRWBS: 1.HPC.U1.04.005.035	Other Nuclear Island Buildings	01-Jun-2083	18-May-2094	11.00y	£9.73
EPRWBS: 1.HPC.U1.04.005.040	Access Building	09-Sep-2092	04-Oct-2094	2.08y	£2.91
EPRWBS: 1.HPC.U1.04.005.045	Waste / Effluent Building (HQA / HQB)	16 Aug 2096	13 Jul 2096	0.92y	£0.79
EPRWBS: 1.HPC.U1.04.005.050	Backup Diesels	12-Oct-2093	11-Feb-2095	1.35y	£2.56
EPRWBS: 1.HPC.U1.04.005.055	Functional Simplification	01-Jun-2083	02-Apr-2085	1.85y	£11.75
EPRWBS: 1.HPC.U1.04.005.060	New Works	01-Jun-2083	01-May-2084	0.92y	£11.24
EPRWBS: 1.HPC.U1.04.005.065	Dismantling Preparation	01-Jun-2083	03-Feb-2087	3.69y	£5.11
EPRWBS: 1.HPC.U1.04.005.070	Nuclear Island Demolition Support	06-Oct-2093	18-Jan-2100	6.31y	£10.73
EPRWBS: 1.HPC.U1.04.005.075	Nuclear Island Dismantling Secondary Wastes	01-Jun-2083	18-Feb-2101	17.78y	£14.19
EPRWBS: 1.HPC.U1.04.010	Conventional Island (CI)	01-Jun-2083	08-Nov-2101	18.50y	£6.37
EPRWBS: 1.HPC.U1.04.010.005	Turbine Hall	01-Jun-2083	29-Oct-2096	13.46y	£5.46
EPRWBS: 1.HPC.U1.04.010.010	Other Conventional Island Buildings	21-Feb-2101	08-Nov-2101	0.72y	£0.90
EPRWBS: 1.HPC.U1.04.015	Balance Of Plant (BOP)	30-May-2087	15-Mar-2103	15.85y	£7.46
EPRWBS: 1.HPC.U1.04.015.005	CW System	30-May-2087	25-Sep-2091	4.34y	£7.18
EPRWBS: 1.HPC.U1.04.015.010	Other Balance of Plant	12-Jul-2101	15-Mar-2103	1.68y	£0.28
EPRWBS: 1.HPC.U2	UNIT 2	30-Nov-2084	14-May-2104	19.52y	£415.20
EPRWBS: 1.HPC.U2.01	FUEL MANAGEMENT (Activity 01)	30-Nov-2084	30-Nov-2088	4.02y	£0.00
EPRWBS: 1.HPC.U2.01.015	Reactor Defuelling and Fuel Despatch	30-Nov-2084	30-Nov-2088	4.02y	£0.00
EPRWBS: 1.HPC.U2.01.015.005	Fuel Removal Operations from Reactor	30-Nov-2084	08-Dec-2084	0.03y	£0.00
EPRWBS: 1.HPC.U2.01.015.010	Fuel Storage in Cooling Pond	30-Nov-2084	01-Dec-2087	3.01y	£0.00
EPRWBS: 1.HPC.U2.01.015.015	Fuel Transfer from Fuel Building Pond to Spent Fuel Interim Storage Facility	02-Dec-2087	30-Nov-2088	1.40y	£0.00
EPRWBS: 1.HPC.U2.02	SITE OPERATION & PLANT PREPARATION (Activity 02)	30-Nov-2084	14-May-2104	19.52y	£17.86
EPRWBS: 1.HPC.U2.02.001	Making Safe Redundant Systems & Plant	30-Nov-2084	14-May-2104	19.52y	£0.00
EPRWBS: 1.HPC.U2.02.001.000	Non Maintenance Group Specific	30-Nov-2084	14-May-2104	19.52y	£0.00
EPRWBS: 1.HPC.U2.02.003	Primary Circuit Decontamination (PCD)	30-Nov-2084	26-Dec-2085	1.08y	£17.86
EPRWBS: 1.HPC.U2.02.003.010	PCD Installation and Commissioning	30-Nov-2084	31-Oct-2085	0.92y	£1.53
EPRWBS: 1.HPC.U2.02.003.015	PCD Operations	01-Nov-2085	26-Dec-2085	0.15y	£7.15
EPRWBS: 1.HPC.U2.02.003.025	PCD Waste Management	01-Nov-2085	28-Nov-2085	0.08y	£9.17
EPRWBS: 1.HPC.U2.02.045	Site Plant Maintenance during Decommissioning	30-Nov-2084	14-May-2104	19.52y	£0.00
EPRWBS: 1.HPC.U2.02.045.020	During Plant Decommissioning	30-Nov-2084	14-May-2104	19.52y	£0.00
EPRWBS: 1.HPC.U2.02.050	Plant Operations During Decommissioning	30-Nov-2084	14-May-2104	19.52y	£0.00
EPRWBS: 1.HPC.U2.02.050.020	During Plant Decommissioning	30-Nov-2084	14-May-2104	19.52y	£0.00
EPRWBS: 1.HPC.U2.03	MANAGEMENT OPERATIONAL WASTES (Activity 03)	30-Nov-2084	24-Nov-2089	5.00y	£24.47
EPRWBS: 1.HPC.U2.03.005	Retrieval, Processing, Transport and Disposal	30-Nov-2084	24-Nov-2089	5.00y	£24.47
EPRWBS: 1.HPC.U2.03.005.005	ILW Operational Waste	30-Nov-2084	24-Nov-2089	5.00y	£16.81
EPRWBS: 1.HPC.U2.03.005.010	LLW Operational Waste	30-Nov-2084	24-Nov-2089	5.00y	£7.65
EPRWBS: 1.HPC.U2.04	PLANT & REACTOR DECOMMISSIONING (Activity 04)	30-Nov-2084	29-Mar-2103	18.39y	£372.87
EPRWBS: 1.HPC.U2.04.005	Nuclear Island (NI)	30-Nov-2084	18-Feb-2101	16.28y	£360.10
EPRWBS: 1.HPC.U2.04.005.005	Reactor Building	01-Jul-2086	18-Feb-2101	14.69y	£182.60
EPRWBS: 1.HPC.U2.04.005.010	Fuel Building	01-Dec-2088	14-Jun-2097	8.57y	£32.79
EPRWBS: 1.HPC.U2.04.005.015	Safeguard Buildings	01-Dec-2088	28-Dec-2096	8.11y	£46.32
EPRWBS: 1.HPC.U2.04.005.025	NuclearAuxiliary Building	18-Aug-2092	16-May-2098	5.77y	£23.68
EPRWBS: 1.HPC.U2.04.005.035	Other Nuclear Island Buildings	30-Nov-2084	19-Jul-2094	9.67y	£9.73
EPRWBS: 1.HPC.U2.04.005.040	Access Building	10-Nov-2092	03-Dec-2094	2.08y	£2.91
EPRWBS: 1.HPC.U2.04.005.045	Waste / Effluent Building (HQC)	18-Aug-2092	13-Jul-2096	3.92y	£6.49
EPRWBS: 1.HPC.U2.04.005.050	Backup Diesels	07-Dec-2093	06-May-2095	1.42y	£2.56
EPRWBS: 1.HPC.U2.04.005.055	Functional Simplification	30-Nov-2084	28-Jun-2086	1.58y	£11.75
EPRWBS: 1.HPC.U2.04.005.060	New Works	30-Nov-2084	31-Oct-2085	0.92y	£11.24
EPRWBS: 1.HPC.U2.04.005.065	Dismantling Preparation	30-Nov-2084	04-Aug-2088	3.69y	£5.11
EPRWBS: 1.HPC.U2.04.005.070	Nuclear Island Demolition Support	07-Dec-2093	18-Feb-2101	7.23y	£10.73
EPRWBS: 1.HPC.U2.04.005.075	Nuclear Island Dismantling Secondary Wastes	30-Nov-2084	18-Feb-2101	16.28y	£14.19
EPRWBS: 1.HPC.U2.04.010	Conventional Island (CI)	30-Nov-2084	08-Nov-2101	17.00y	£5.31
EPRWBS: 1.HPC.U2.04.010.005	Turbine Hall	30-Nov-2084	01-Aug-2086	1.68y	£4.41
EPRWBS: 1.HPC.U2.04.010.010	Other Conventional Island Buildings	21-Feb-2101	08-Nov-2101	0.72y	£0.90
EPRWBS: 1.HPC.U2.04.015	Balance Of Plant (BOP)	01-Dec-2088	29-Mar-2103	14.37y	£7.46
EPRWBS: 1.HPC.U2.04.015.005	CW System	01-Dec-2088	25-Sep-2091	2.83y	£7.18
EPRWBS: 1.HPC.U2.04.015.010	Other Balance of Plant	12-Jul-2101	29-Mar-2103	1.72y	£0.27



Remaining Level of Effort
Remaining Work
Critical Remaining Work
Milestone
Summary

UK PROTECT - COMMERCIAL

TASK filters: Excluding Tasks which are TECHNICAL MATT, PRINT OUTPUT - Excludes Milestone Tasks.

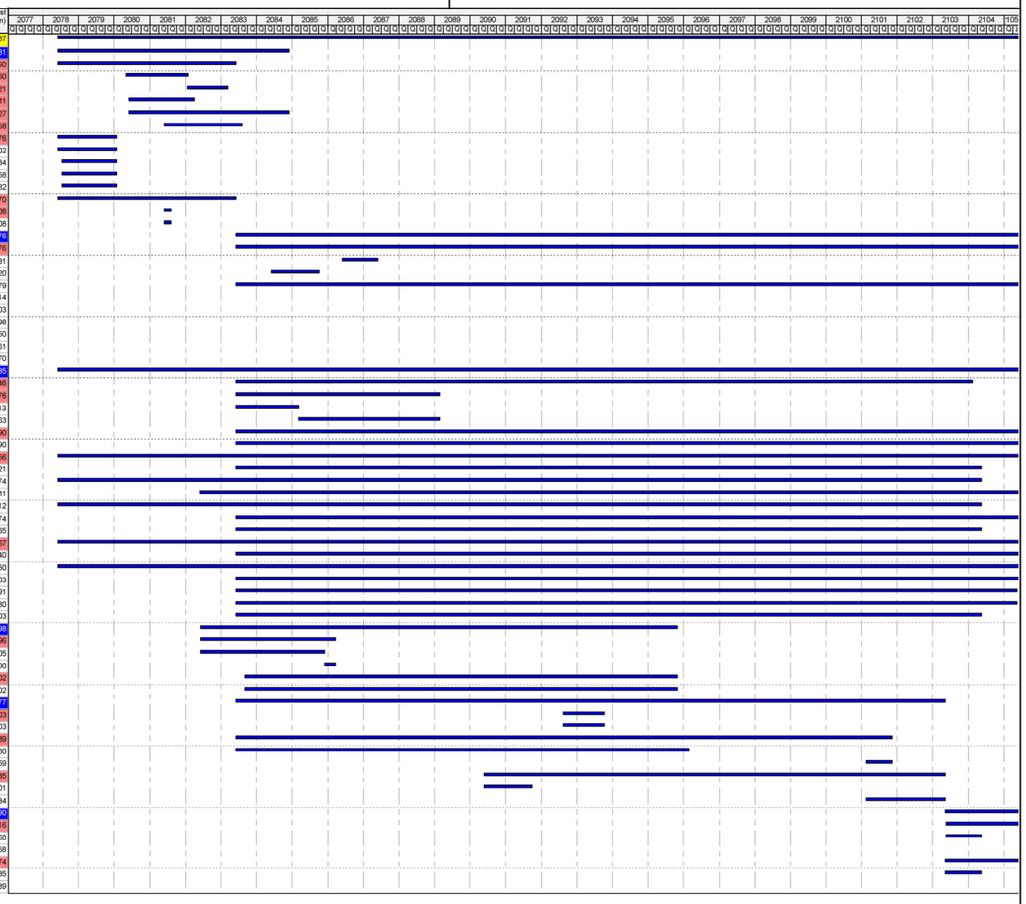
Figure 4: HPC Summary Decommissioning and Waste Management Schedule

HPC Decommissioning and Waste Management Plan - Live Schedule
Schedule Dataset: May 2014

UK PROTECT - COMMERCIAL

HPC DWMP Rev 4.0 - Summary Schedule

Activity ID	Activity Name	Start	Finish	Duration	EPR Base Cost (£m)
EPRWBS: 1.HPC.COM	COMMON PLANT	01-Jun-2078	21-Jul-2150	72.36y	£5,154.57
EPRWBS: 1.HPC.COM.00	PRE CLOSURE PREPARATORY WORK (Activity 0)	01-Jun-2078	29-Nov-2084	6.52y	£20.81
EPRWBS: 1.HPC.COM.00.001	Strategic Review and Decommissioning Plan Development	01-Jun-2078	31-May-2083	5.00y	£3.60
EPRWBS: 1.HPC.COM.00.015	Environmental Impact Statement	01-May-2080	26-Jan-2082	1.75y	£0.50
EPRWBS: 1.HPC.COM.00.020	National & Local Planning Permission	21-Jan-2082	10-Mar-2083	1.14y	£0.21
EPRWBS: 1.HPC.COM.00.025	Article 37 Submission	29-May-2080	31-Mar-2082	1.85y	£0.11
EPRWBS: 1.HPC.COM.00.045	Revise Station Maintenance Schedule	29-May-2080	29-Nov-2084	4.52y	£1.27
EPRWBS: 1.HPC.COM.00.050	Revise Discharge Authorisations	30-May-2081	05-Aug-2083	2.19y	£1.58
EPRWBS: 1.HPC.COM.00.060	Programme Management Development	01-Jun-2078	23-Jan-2080	1.65y	£10.76
EPRWBS: 1.HPC.COM.00.060.010	Preliminaries	01-Jun-2078	23-Jan-2080	1.65y	£3.02
EPRWBS: 1.HPC.COM.00.060.020	Integration Workstreams	13-Jul-2078	23-Jan-2080	1.54y	£2.34
EPRWBS: 1.HPC.COM.00.060.030	Workstreams Tranche 1	13-Jul-2078	23-Jan-2080	1.54y	£2.58
EPRWBS: 1.HPC.COM.00.060.040	Workstreams Tranche 2	13-Jul-2078	23-Jan-2080	1.54y	£2.82
EPRWBS: 1.HPC.COM.00.070	Pre-Closure Planning Staffing Requirements	01-Jun-2078	31-May-2083	5.02y	£2.70
EPRWBS: 1.HPC.COM.00.200	Environmental Monitoring programme	28-May-2081	05-Aug-2081	0.19y	£0.08
EPRWBS: 1.HPC.COM.00.200.010	Environmental Monitoring (CODE TBC)	28-May-2081	05-Aug-2081	0.19y	£0.08
EPRWBS: 1.HPC.COM.01	FUEL MANAGEMENT (Activity 01)	01-Jun-2083	21-Jul-2150	67.37y	£3,918.76
EPRWBS: 1.HPC.COM.01.015	Reactor Defuelling and Fuel Despatch	01-Jun-2083	21-Jul-2150	67.37y	£3,918.76
EPRWBS: 1.HPC.COM.01.015.020	Convert ISFS for Autonomous Operation	29-May-2086	27-May-2087	1.00y	£1.81
EPRWBS: 1.HPC.COM.01.015.022	Relicense Autonomous ISFS	31-May-2084	03-Oct-2085	1.35y	£0.20
EPRWBS: 1.HPC.COM.01.015.025	Interim Spent Fuel Store Operation	01-Jun-2083	20-Jul-2147	64.36y	£662.79
EPRWBS: 1.HPC.COM.01.015.030	Spent Fuel Transport and Disposal	02-Jun-2138	20-Jul-2147	9.17y	£2,370.14
EPRWBS: 1.HPC.COM.01.015.035	Interim Spent Fuel Store Decommissioning	21-Jul-2147	17-Jul-2149	2.00y	£17.03
EPRWBS: 1.HPC.COM.01.016.037	Spent Fuel Encapsulation Facility Planning (FULL COST TO HPC)	06 Jun 2132	02 Jun 2134	2.00y	£9.98
EPRWBS: 1.HPC.COM.01.015.040	Spent Fuel Encapsulation Facility Construction (FULL COST to HPC)	03-Jun-2134	02-Jun-2138	4.01y	£504.50
EPRWBS: 1.HPC.COM.01.015.045	Spent Fuel Encapsulation Facility Operation (FULL COST TO HPC)	02-Jun-2138	21-Jul-2147	9.17y	£331.61
EPRWBS: 1.HPC.COM.01.015.050	Spent Fuel Encapsulation Facility Decommissioning (FULL COST TO HPC)	21-Jul-2147	21-Jul-2150	3.01y	£20.70
EPRWBS: 1.HPC.COM.02	SITE OPERATION & PLANT PREPARATION (Activity 02)	01-Jun-2078	16-Jul-2150	72.37y	£924.35
EPRWBS: 1.HPC.COM.02.010	Activity 2 Staffing Levels	01-Jun-2083	13-Feb-2104	20.78y	£286.46
EPRWBS: 1.HPC.COM.02.030	New Decommissioning Electrical Supply & Electrical Distribution System (DSE	01-Jun-2083	22-Feb-2089	5.75y	£7.76
EPRWBS: 1.HPC.COM.02.030.010	New Decommissioning Site Incoming Electrical Supply (DSIES)	01 Jun 2083	07 Mar 2085	1.78y	£4.13
EPRWBS: 1.HPC.COM.02.030.020	New Decommissioning Site Electrical Distribution System (DSEDS)	08-Mar-2085	22-Feb-2089	3.98y	£3.63
EPRWBS: 1.HPC.COM.02.035	Active Waste Treatment System	01-Jun-2083	28-Aug-2149	66.47y	£3.90
EPRWBS: 1.HPC.COM.02.035.040	New Effluent Discharge Arrangements	01-Jun-2083	28-Aug-2149	66.47y	£3.90
EPRWBS: 1.HPC.COM.02.100	Site Overheads	01-Jun-2078	16-Jul-2150	72.37y	£343.56
EPRWBS: 1.HPC.COM.02.100.020	Site Management & Arrangements, Facilities, Services and Admin	01-Jun-2083	14-May-2104	21.03y	£205.21
EPRWBS: 1.HPC.COM.02.100.030	Operations and Project Support to Decommissioning	01-Jun-2078	14-May-2104	26.04y	£40.74
EPRWBS: 1.HPC.COM.02.100.060	Records & Knowledge Management for Decommissioning	27 May 2082	14 Apr 2136	53.07y	£8.11
EPRWBS: 1.HPC.COM.02.100.070	Programme Management and Controls	01-Jun-2078	14-May-2104	26.04y	£37.12
EPRWBS: 1.HPC.COM.02.100.080	Site Staff Redundancy costs	01-Jun-2083	16-Jul-2150	67.36y	£40.74
EPRWBS: 1.HPC.COM.02.100.200	Environmental Management	01-Jun-2083	14-May-2104	21.03y	£11.65
EPRWBS: 1.HPC.COM.02.200	Corporate Support Costs	01-Jun-2078	14-Jul-2150	72.37y	£282.67
EPRWBS: 1.HPC.COM.02.200.010	Corporate Staff Support	01-Jun-2083	14-Jul-2150	67.35y	£63.40
EPRWBS: 1.HPC.COM.02.200.020	Regulatory Costs	01-Jun-2078	14-Jul-2150	72.37y	£42.50
EPRWBS: 1.HPC.COM.02.200.030	Civil Nuclear Constabulary Costs	01-Jun-2083	20-Jul-2147	64.36y	£76.03
EPRWBS: 1.HPC.COM.02.200.040	Fundco Operating Costs	01-Jun-2083	13-May-2105	22.03y	£13.91
EPRWBS: 1.HPC.COM.02.200.050	DECC Charges	01-Jun-2083	13-May-2105	22.03y	£4.80
EPRWBS: 1.HPC.COM.02.200.070	Insurance Costs During Decommissioning & Spent Fuel Management	01-Jun-2083	14-May-2104	21.03y	£82.03
EPRWBS: 1.HPC.COM.03	MANAGEMENT OPERATIONAL WASTES (Activity 03)	02-Jun-2082	27-Oct-2095	13.45y	£175.98
EPRWBS: 1.HPC.COM.03.020	ILW Interim Storage Facility (ILW ISF)	02-Jun-2082	18-Mar-2086	3.81y	£173.96
EPRWBS: 1.HPC.COM.03.020.015	ILWISF - Store Emptying	02-Jun-2082	26-Nov-2085	3.50y	£172.05
EPRWBS: 1.HPC.COM.03.020.020	Interim Waste Storage - Decommission & Demolition	27-Nov-2085	18-Mar-2086	0.31y	£1.90
EPRWBS: 1.HPC.COM.03.025	Active Waste Treatment Systems	01-Sep-2083	27-Oct-2095	12.20y	£2.02
EPRWBS: 1.HPC.COM.03.025.060	Mobile AETP	01-Sep-2083	27-Oct-2095	12.20y	£2.02
EPRWBS: 1.HPC.COM.04	PLANT & REACTOR DECOMMISSIONING (Activity 04)	01-Jun-2083	10-May-2103	20.01y	£87.77
EPRWBS: 1.HPC.COM.04.005	Nuclear Island (NI)	18-Aug-2092	09-Oct-2093	1.15y	£17.03
EPRWBS: 1.HPC.COM.04.005.045	Waste / Effluent Building (HQA / HQB)	18-Aug-2092	09-Oct-2093	1.15y	£17.03
EPRWBS: 1.HPC.COM.04.010	Conventional Island (CI)	01-Jun-2083	08-Nov-2101	18.50y	£66.39
EPRWBS: 1.HPC.COM.04.010.005	Turbine Hall	01-Jun-2083	24-Feb-2096	12.76y	£65.80
EPRWBS: 1.HPC.COM.04.010.010	Other Conventional Island Buildings	21-Feb-2101	08-Nov-2101	0.72y	£0.59
EPRWBS: 1.HPC.COM.04.015	Balance Of Plant (BOP)	25-May-2090	10-May-2103	13.00y	£4.35
EPRWBS: 1.HPC.COM.04.015.005	CW System	25-May-2090	25-Sep-2091	1.34y	£0.01
EPRWBS: 1.HPC.COM.04.015.010	Other Balance of Plant	21-Feb-2101	10-May-2103	2.23y	£4.34
EPRWBS: 1.HPC.COM.05	SITE CLEARANCE & RELEASE for REUSE (Activity 05)	11-May-2103	14-Jul-2150	47.34y	£26.90
EPRWBS: 1.HPC.COM.05.010	Site Delicencing	21-May-2103	14-Jul-2150	47.32y	£1.16
EPRWBS: 1.HPC.COM.05.010.005	Power Generation Site Area - Delicensing	21-May-2103	14-May-2104	0.99y	£0.58
EPRWBS: 1.HPC.COM.05.010.010	Transferred ISFS Area of Site - Delicensing	18-Jul-2149	14-Jul-2150	0.99y	£0.58
EPRWBS: 1.HPC.COM.05.200	Environmental Management	11-May-2103	25-Aug-2149	46.45y	£25.74
EPRWBS: 1.HPC.COM.05.200.005	Landscaping of Generating Plant Area of Site	11-May-2103	14-May-2104	1.02y	£24.35
EPRWBS: 1.HPC.COM.05.200.010	Landscaping of Interin Spent Fuel Store Area of Site	18-Jul-2149	25-Aug-2149	0.10y	£1.39



Remaining Level of Effort
Remaining Work
Critical Remaining Work
Milestone
Summary

UK PROTECT - COMMERCIAL

TASK filters: Excluding Tasks which are TECHNICAL MATT, PRINT OUTPUT - Excludes Milestone Tasks.

Figure 4: HPC Summary Decommissioning and Waste Management Schedule (Continued)

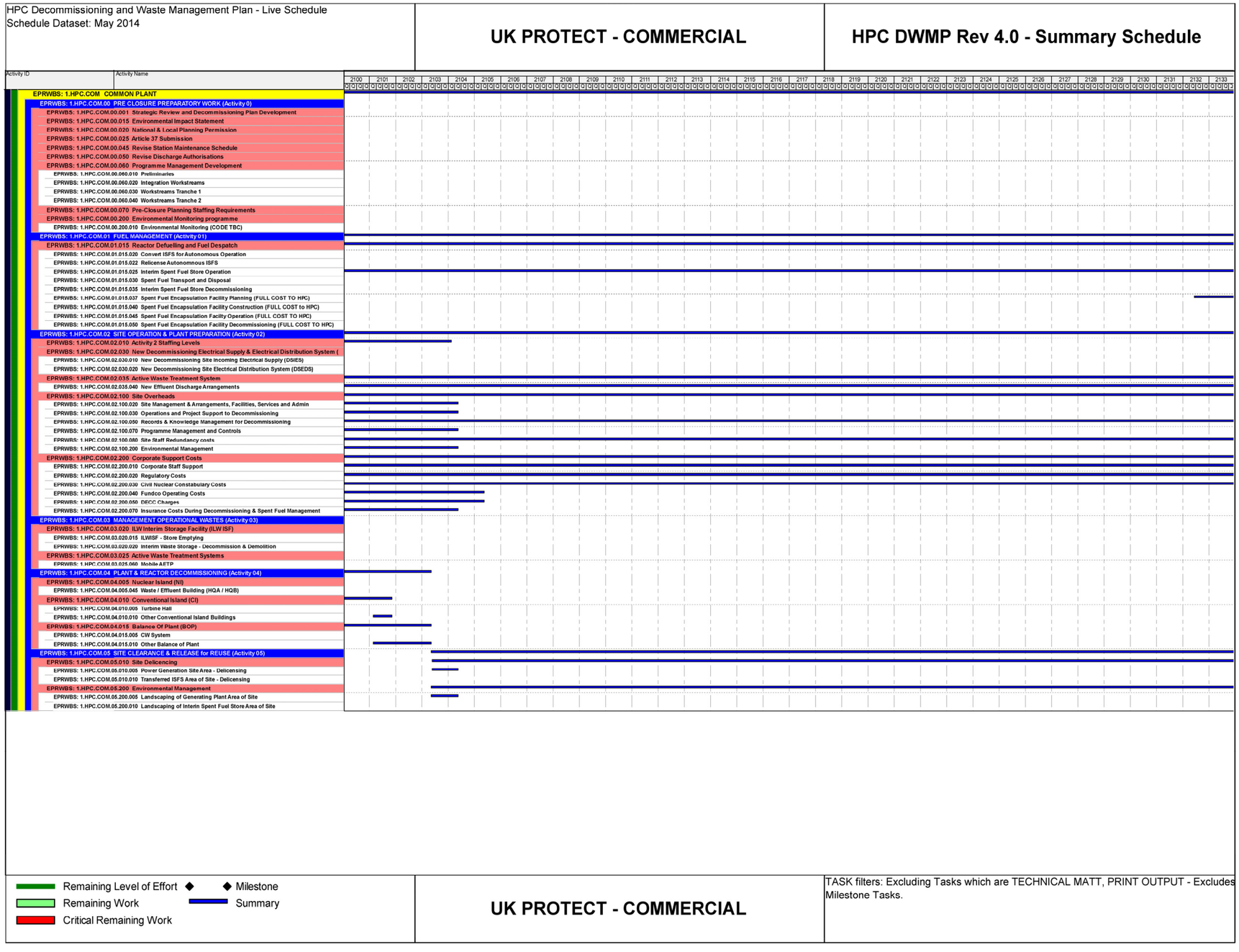


Figure 4: HPC Summary Decommissioning and Waste Management Schedule (Continued)

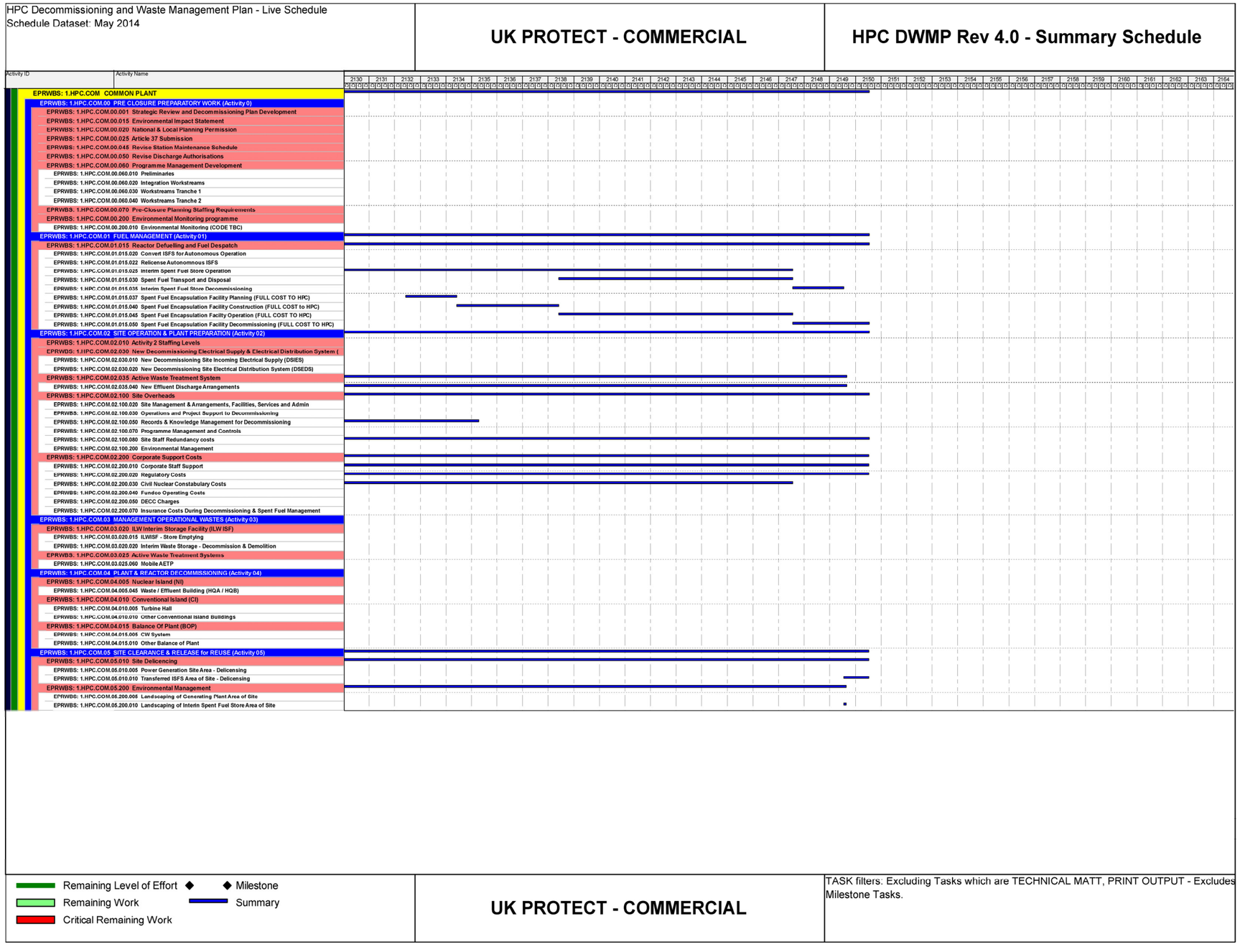


Figure 4: HPC Summary Decommissioning and Waste Management Schedule (Continued)

6 DECOMMISSIONING AND WASTE MANAGEMENT COSTS

This DWMP details the steps to be taken in relation to "Technical Matters" and provides estimates of the costs likely to be incurred in taking steps in relation to "Designated Technical Matters".

6.1 BASE COST ESTIMATE, P80 COST ESTIMATE AND CASH FLOW

The total estimated cost for the decommissioning and waste management at HPC is presented at summary level in Table 2. This table sets out the current estimate which was prepared at a detailed level and presented in Table 6 formatted against the EPRCRS, plus any subsequent changes which have been identified immediately prior to issue of this DWMP. Any identified changes have been "change controlled" into the "Live" HPC schedule and cost estimate to accurately reflect the basis of the HPC cost estimate.

The costs formatted against the EPRWBS in Table 3, Table 4 and Table 5 reflect the way in which the work is expected to be carried out, while Table 6 presents the same cost data against the EPRCRS which reflects the structure of the cost estimates required by DECC. Following a review of the EPCRS coding, the EPCRS codes against a number of the cost elements have been revised. This has the effect of allocating the costs more appropriately to the cost centres, in line with DECC guidance, while not changing the total cost. Further detail is provided in the DDWMP Chapter 18.

Section 8 sets out the processes used in the derivation of the cost estimates and an analysis of the level and source of risk and uncertainty in those estimates. The basis of the methodologies and their application to the HPC cost estimates is further detailed in the DDWMP.

6.2 INPUT DATA REQUIRED FOR THE FAP AND WTC

The DWMP, supported by the DDWMP, provides the input data required by the FAP and WTC to perform the contribution calculations for the production of the contributions notice at each Annual Review and Quinquennial Review.

Annexe A-1 of this DWMP provides a schedule of annual cash outflows (in the money of the day) for each year in which there is a cash outflow relating to the Designated Technical Matters. The costs are presented separately in the following categories:

1. The Cost of Pre-closure Decommissioning Planning – All DTM tasks that occur prior to Unit 1 EoG with the exception of ILW Disposal.

2. The Cost of Decommissioning – All costs relating to DTM from Unit 1 EoG up to the Waste Transfer Date with the exception of ILW Disposal.

3. The Costs of Spent Fuel Management – All costs relating to DTM after the Waste Transfer Date with the exception of Spent Fuel Disposal.

4. The Costs of ILW Disposal – ILW disposal costs up to the transfer date only.

5. The Costs of Spent Fuel Disposal – Spent Fuel disposal costs only.

Under the WTC title to the HPC waste, including spent fuel, will transfer to Government along with the payment of a Waste Transfer Fee to meet the costs of waste management and disposal. The expected timing for this will be set out in the WTC. It is currently expected that title to ILW will transfer on delivery to the GDF during the decommissioning period, subject to the availability of the GDF at that time, and that title to and liability for spent fuel will transfer to Government at the end of the decommissioning period.

The DWMP provides a clear link to the WTC by providing the post transfer date waste management costs, the schedule for those costs and, using the data package provided by DECC, the cost and schedule for ILW and spent fuel disposal.

Using the costs provided within the DWMP, the fee payable to Government at the end of the decommissioning period to take title to the HPC waste and storage facility can be calculated through the mechanism set out within the WTC.

The summary schedule within this DWMP shows the completion of decommissioning and delicensing on HPC.COM.05.010.005 falling on the 14/05/2104. This aligns with the detailed milestones set out within the DDWMP on which HPC Power Plant Area Decommissioning and Site Clearance is scheduled to be completed (Activity HPC.COM.05.M05), defined as the Decommissioning End Date in the WTC, and the Spent Fuel Transfer Date (Activity HPC.COM.05.M12); these milestones are calculated to occur on 14/05/2104. At this date the HPC site will consist of only the Interim Spent Fuel Store containing the full inventory of HPC spent fuel. The site previously occupied by the HPC reactors and their ancillary buildings, including the ILW Interim Storage Facility, will have been decommissioned and delicensed and the ISFS will have been relicensed and will be operating autonomously.

The transfer date, and therefore the date on which activities begin to be categorised as Spent Fuel Management Costs, is taken to be the end of the year in which the scheduled transfer date falls, i.e. 31/12/2104.

The summary Base and P80 cost associated with each of the 5 categories of cost is presented in Table 7. The summary cash flow underpinning the FAP and WTC calculations is provided in the DWMP Annexe A-1.

A further DWMP output is required by the FAP in order to calculate a representative cost for additional storage of spent fuel at HPC in the event of closure at year 40. The input data for the calculation of the Additional Storage Amount is presented in Annexe A-1. This value is calculated as twenty times the average real yearly cost of waste storage over any continuous period of five Financial Periods. The average yearly cost of spent fuel management has been calculated by selecting those falling between 2110 and 2115 as being suitably representative.

	Base Cost £M	P80 Cost £M
Total HPC Cost	**£5, 985**	**£7,166**
02 Designated Technical Matter	**£3,353**	**£4,320**
Existing Total from Table 6	£3,353	£4,320
Change in Cost – Ref. A below	£0	£0
03 (DTM) ILW Disposal	**£278**	**£321**
Existing Total from Table 6	£278	£321
Change in Cost – Ref. B below	£0	£0
04 (DTM) Spent Fuel Disposal	**£2,355**	**£2,526**
Existing Total from Table 6	£2,355	£2,526
Change in Cost – Ref. C below	£0	£0

Ref.	Identified Change
A	None
B	None
C	None

(Note: Costs are rounded to the nearest £1M)

Table 2: HPC Decommissioning and Waste Management Costs

Activity ID and Name	Base Cost (£m)	P80 Cost (£m)
EPRWBS: 1 EDF ENERGY NNB GenCo NUCLEAR FLEET	£5,985	£7,166
EPRWBS: 1.HPC HINKLEY POINT C	£5,985	£7,166
EPRWBS: 1.HPC.U1 UNIT 1	£416	£570
EPRWBS: 1.HPC.U1.00 PRE CLOSURE PREPARATORY WORK (Activity 0)	£0	£0
EPRWBS: 1.HPC.U1.01 FUEL MANAGEMENT (Activity 01)	£0	£1
EPRWBS: 1.HPC.U1.01.015 Reactor Defuelling and Fuel Despatch	£0	£1
EPRWBS: 1.HPC.U1.01.015.005 Fuel Removal Operations from Reactor	£0	£0
EPRWBS: 1.HPC.U1.01.015.010 Fuel Storage in Cooling Pond	£0	£1
EPRWBS: 1.HPC.U1.01.015.015 Fuel Transfer from Fuel Building Pond to Spent Fuel Interim	£0	£0
EPRWBS: 1.HPC.U1.02 SITE OPERATION & PLANT PREPARATION (Activity 02)	£20	£51
EPRWBS: 1.HPC.U1.02.001 Making Safe Redundant Systems & Plant	£0	£0
EPRWBS: 1.HPC.U1.02.001.000 Non Maintenance Group Specific	£0	£0
EPRWBS: 1.HPC.U1.02.003 Primary Circuit Decontamination (PCD)	£20	£51
EPRWBS: 1.HPC.U1.02.003.005 PCD Engineering Design	£2	£6
EPRWBS: 1.HPC.U1.02.003.010 PCD Installation and Commissioning	£2	£4
EPRWBS: 1.HPC.U1.02.003.015 PCD Operations	£7	£18
EPRWBS: 1.HPC.U1.02.003.025 PCD Waste Management	£9	£23
EPRWBS: 1.HPC.U1.02.045 Site Plant Maintenance during Decommissioning	£0	£0
EPRWBS: 1.HPC.U1.02.045.020 During Plant Decommissioning	£0	£0
EPRWBS: 1.HPC.U1.02.050 Plant Operations During Decommissioning	£0	£0
EPRWBS: 1.HPC.U1.02.050.020 During Plant Decommissioning	£0	£0
EPRWBS: 1.HPC.U1.03 MANAGEMENT OPERATIONAL WASTES (Activity 03)	£24	£30
EPRWBS: 1.HPC.U1.03.005 Retrieval, Processing, Transport and Disposal	£24	£30
EPRWBS: 1.HPC.U1.03.005.005 ILW Operational Waste	£17	£18
EPRWBS: 1.HPC.U1.03.005.010 LLW Operational Waste	£8	£12
EPRWBS: 1.HPC.U1.04 PLANT & REACTOR DECOMMISSIONING (Activity 04)	£371	£489
EPRWBS: 1.HPC.U1.04.005 Nuclear Island (NI)	£357	£469
EPRWBS: 1.HPC.U1.04.005.005 Reactor Building	£187	£243
EPRWBS: 1.HPC.U1.04.005.010 Fuel Building	£33	£43
EPRWBS: 1.HPC.U1.04.005.015 Safeguard Buildings	£44	£62
EPRWBS: 1.HPC.U1.04.005.025 Nuclear Auxiliary Building	£24	£32
EPRWBS: 1.HPC.U1.04.005.035 Other Nuclear Island Buildings	£10	£12
EPRWBS: 1.HPC.U1.04.005.040 Access Building	£3	£4
EPRWBS: 1.HPC.U1.04.005.045 Waste / Effluent Building (HQA / HQB)	£1	£1
EPRWBS: 1.HPC.U1.04.005.050 Backup Diesels	£3	£3
EPRWBS: 1.HPC.U1.04.005.055 Functional Simplification	£12	£15
EPRWBS: 1.HPC.U1.04.005.060 New Works	£11	£13
EPRWBS: 1.HPC.U1.04.005.065 Dismantling Preparation	£5	£7
EPRWBS: 1.HPC.U1.04.005.070 Nuclear Island Demolition Support	£11	£13
EPRWBS: 1.HPC.U1.04.005.075 Nuclear Island Dismantling Secondary Wastes	£14	£21
EPRWBS: 1.HPC.U1.04.010 Conventional Island (CI)	£6	£10
EPRWBS: 1.HPC.U1.04.010.005 Turbine Hall	£5	£9
EPRWBS: 1.HPC.U1.04.010.010 Other Conventional Island Buildings	£1	£1
EPRWBS: 1.HPC.U1.04.015 Balance Of Plant (BOP)	£7	£10
EPRWBS: 1.HPC.U1.04.015.005 CW System	£7	£9
EPRWBS: 1.HPC.U1.04.015.010 Other Balance of Plant	£0	£0

Table 3: Hinkley Point C Unit 1 Decommissioning and Waste Management Costs Estimate formatted by the EPRWBS

Activity ID and Name	Base Cost (£m)	P80 Cost (£m)
EPRWBS: 1 EDF ENERGY NNB GenCo NUCLEAR FLEET	£5,985	£7,166
EPRWBS: 1.HPC HINKLEY POINT C	£5,985	£7,166
EPRWBS: 1.HPC.U1 UNIT 1	£416	£570
EPRWBS: 1.HPC.U2 UNIT 2	£415	£571
EPRWBS: 1.HPC.U2.00 PRE CLOSURE PREPARATORY WORK (Activity 0)	£0	£0
EPRWBS: 1.HPC.U2.01 FUEL MANAGEMENT (Activity 01)	£0	£1
EPRWBS: 1.HPC.U2.01.015 Reactor Defuelling and Fuel Despatch	£0	£1
EPRWBS: 1.HPC.U2.01.015.005 Fuel Removal Operations from Reactor	£0	£0
EPRWBS: 1.HPC.U2.01.015.010 Fuel Storage in Cooling Pond	£0	£1
EPRWBS: 1.HPC.U2.01.015.015 Fuel Transfer from Fuel Building Pond to Spent Fuel Interim	£0	£0
EPRWBS: 1.HPC.U2.02 SITE OPERATION & PLANT PREPARATION (Activity 02)	£18	£45
EPRWBS: 1.HPC.U2.02.001 Making Safe Redundant Systems & Plant	£0	£0
EPRWBS: 1.HPC.U2.02.001.000 Non Maintenance Group Specific	£0	£0
EPRWBS: 1.HPC.U2.02.003 Primary Circuit Decontamination (PCD)	£18	£45
EPRWBS: 1.HPC.U2.02.003.010 PCD Installation and Commissioning	£2	£4
EPRWBS: 1.HPC.U2.02.003.015 PCD Operations	£7	£18
EPRWBS: 1.HPC.U2.02.003.025 PCD Waste Management	£9	£23
EPRWBS: 1.HPC.U2.02.045 Site Plant Maintenance during Decommissioning	£0	£0
EPRWBS: 1.HPC.U2.02.045.020 During Plant Decommissioning	£0	£0
EPRWBS: 1.HPC.U2.02.050 Plant Operations During Decommissioning	£0	£0
EPRWBS: 1.HPC.U2.02.050.020 During Plant Decommissioning	£0	£0
EPRWBS: 1.HPC.U2.03 MANAGEMENT OPERATIONAL WASTES (Activity 03)	£24	£30
EPRWBS: 1.HPC.U2.03.005 Retrieval, Processing, Transport and Disposal	£24	£30
EPRWBS: 1.HPC.U2.03.005.005 ILW Operational Waste	£17	£18
EPRWBS: 1.HPC.U2.03.005.010 LLW Operational Waste	£8	£12
EPRWBS: 1.HPC.U2.04 PLANT & REACTOR DECOMMISSIONING (Activity 04)	£373	£495
EPRWBS: 1.HPC.U2.04.005 Nuclear Island (NI)	£360	£477
EPRWBS: 1.HPC.U2.04.005.005 Reactor Building	£183	£240
EPRWBS: 1.HPC.U2.04.005.010 Fuel Building	£33	£43
EPRWBS: 1.HPC.U2.04.005.015 Safeguard Buildings	£46	£65
EPRWBS: 1.HPC.U2.04.005.025 Nuclear Auxiliary Building	£24	£32
EPRWBS: 1.HPC.U2.04.005.035 Other Nuclear Island Buildings	£10	£12
EPRWBS: 1.HPC.U2.04.005.040 Access Building	£3	£4
EPRWBS: 1.HPC.U2.04.005.045 Waste / Effluent Building (HQC)	£6	£9
EPRWBS: 1.HPC.U2.04.005.050 Backup Diesels	£3	£3
EPRWBS: 1.HPC.U2.04.005.055 Functional Simplification	£12	£15
EPRWBS: 1.HPC.U2.04.005.060 New Works	£11	£13
EPRWBS: 1.HPC.U2.04.005.065 Dismantling Preparation	£5	£7
EPRWBS: 1.HPC.U2.04.005.070 Nuclear Island Demolition Support	£11	£13
EPRWBS: 1.HPC.U2.04.005.075 Nuclear Island Dismantling Secondary Wastes	£14	£21
EPRWBS: 1.HPC.U2.04.010 Conventional Island (CI)	£5	£8
EPRWBS: 1.HPC.U2.04.010.005 Turbine Hall	£4	£6
EPRWBS: 1.HPC.U2.04.010.010 Other Conventional Island Buildings	£1	£1
EPRWBS: 1.HPC.U2.04.015 Balance Of Plant (BOP)	£7	£10
EPRWBS: 1.HPC.U2.04.015.005 CW System	£7	£9
EPRWBS: 1.HPC.U2.04.015.010 Other Balance of Plant	£0	£0

Table 4: Hinkley Point C Unit 2 Decommissioning and Waste Management Costs Estimate formatted by the EPRWBS

Activity ID and Name	Base Cost (£m)	P80 Cost (£m)
EPRWBS: 1 EDF ENERGY NNB GenCo NUCLEAR FLEET	**£5,985**	**£7,166**
EPRWBS: 1.HPC HINKLEY POINT C	**£5,985**	**£7,166**
EPRWBS: 1.HPC.U1 UNIT 1	**£416**	**£570**
EPRWBS: 1.HPC.U2 UNIT 2	**£415**	**£571**
EPRWBS: 1.HPC.COM COMMON PLANT	**£5,155**	**£6,025**
EPRWBS: 1.HPC.COM.00 PRE CLOSURE PREPARATORY WORK (Activity 0)	**£21**	**£28**
EPRWBS: 1.HPC.COM.00.001 Strategic Review and Decommissioning Plan Development	£4	£4
EPRWBS: 1.HPC.COM.00.015 Environmental Impact Statement	£1	£1
EPRWBS: 1.HPC.COM.00.020 National & Local Planning Permission	£0	£0
EPRWBS: 1.HPC.COM.00.025 Article 37 Submission	£0	£0
EPRWBS: 1.HPC.COM.00.045 Revise Station Maintenance Schedule	£1	£1
EPRWBS: 1.HPC.COM.00.050 Revise Discharge Authorisations	£2	£2
EPRWBS: 1.HPC.COM.00.060 Programme Management Development	£11	£16
EPRWBS: 1.HPC.COM.00.060.010 Preliminaries	£3	£4
EPRWBS: 1.HPC.COM.00.060.020 Integration Workstreams	£2	£3
EPRWBS: 1.HPC.COM.00.060.030 Workstreams Tranche 1	£3	£4
EPRWBS: 1.HPC.COM.00.060.040 Workstreams Tranche 2	£3	£4
EPRWBS: 1.HPC.COM.00.070 Pre-Closure Planning Staffing Requirements	£3	£4
EPRWBS: 1.HPC.COM.00.200 Environmental Monitoring programme	£0	£0
EPRWBS: 1.HPC.COM.00.200.010 Environmental Monitoring (CODE TBC)	£0	£0
EPRWBS: 1.HPC.COM.01 FUEL MANAGEMENT (Activity 01)	**£3,919**	**£4,377**
EPRWBS: 1.HPC.COM.01.015 Reactor Defuelling and Fuel Despatch	£3,919	£4,377
EPRWBS: 1.HPC.COM.01.015.020 Convert ISFS for Autonomous Operation	£2	£2
EPRWBS: 1.HPC.COM.01.015.022 Relicense Autonomnous ISFS	£0	£0
EPRWBS: 1.HPC.COM.01.015.025 Interim Spent Fuel Store Operation	£663	£753
EPRWBS: 1.HPC.COM.01.015.030 Spent Fuel Transport and Disposal	£2,370	£2,544
EPRWBS: 1.HPC.COM.01.015.035 Interim Spent Fuel Store Decommissioning	£17	£21
EPRWBS: 1.HPC.COM.01.015.037 Spent Fuel Encapsulation Facility Planning (FULL COST TO	£10	£12
EPRWBS: 1.HPC.COM.01.015.040 Spent Fuel Encapsulation Facility Construction (FULL COST to	£505	£615
EPRWBS: 1.HPC.COM.01.015.045 Spent Fuel Encapsulation Facilty Operation (FULL COST TO	£332	£404
EPRWBS: 1.HPC.COM.01.015.050 Spent Fuel Encapsulation Facility Decommissioning (FULL	£21	£25
EPRWBS: 1.HPC.COM.02 SITE OPERATION & PLANT PREPARATION (Activity 02)	**£924**	**£1,280**
EPRWBS: 1.HPC.COM.02.010 Activity 2 Staffing Levels	£286	£433
EPRWBS: 1.HPC.COM.02.030 New Decommissioning Electrical Supply & Electrical Distribution	£8	£12
EPRWBS: 1.HPC.COM.02.030.010 New Decommissioning Site Incoming Electrical Supply	£4	£6
EPRWBS: 1.HPC.COM.02.030.020 New Decommissioning Site Electrical Distribution System	£4	£6
EPRWBS: 1.HPC.COM.02.035 Active Waste Treatment System	£4	£6
EPRWBS: 1.HPC.COM.02.035.040 New Effluent Discharge Arrangements	£4	£6
EPRWBS: 1.HPC.COM.02.100 Site Overheads	£344	£438
EPRWBS: 1.HPC.COM.02.100.020 Site Management & Arrangements, Facilities, Services and	£205	£267
EPRWBS: 1.HPC.COM.02.100.030 Operations and Project Support to Decommissioning	£41	£53
EPRWBS: 1.HPC.COM.02.100.050 Records & Knowledge Management for Decommissioning	£8	£11
EPRWBS: 1.HPC.COM.02.100.070 Programme Management and Controls	£37	£48
EPRWBS: 1.HPC.COM.02.100.080 Site Staff Redundancy costs	£41	£44
EPRWBS: 1.HPC.COM.02.100.200 Environmental Management	£12	£15
EPRWBS: 1.HPC.COM.02.200 Corporate Support Costs	£283	£393
EPRWBS: 1.HPC.COM.02.200.010 Corporate Staff Support	£63	£83
EPRWBS: 1.HPC.COM.02.200.020 Regulatory Costs	£43	£55
EPRWBS: 1.HPC.COM.02.200.030 Civil Nuclear Constabulary Costs	£76	£87
EPRWBS: 1.HPC.COM.02.200.040 Fundco Operating Costs	£14	£22
EPRWBS: 1.HPC.COM.02.200.050 DECC Charges	£5	£8
EPRWBS: 1.HPC.COM.02.200.070 Insurance Costs During Decommissioning & Spent Fuel	£82	£137
EPRWBS: 1.HPC.COM.03 MANAGEMENT OPERATIONAL WASTES (Activity 03)	**£176**	**£195**
EPRWBS: 1.HPC.COM.03.020 ILW Interim Storage Facility (ILW ISF)	£174	£192
EPRWBS: 1.HPC.COM.03.020.015 ILWISF - Store Emptying	£172	£189
EPRWBS: 1.HPC.COM.03.020.020 Interim Waste Storage - Decommission & Demolition	£2	£2
EPRWBS: 1.HPC.COM.03.025 Active Waste Treatment Systems	£2	£3
EPRWBS: 1.HPC.COM.03.025.060 Mobile AETP	£2	£3
EPRWBS: 1.HPC.COM.04 PLANT & REACTOR DECOMMISSIONING (Activity 04)	**£88**	**£111**
EPRWBS: 1.HPC.COM.04.005 Nuclear Island (NI)	£17	£24
EPRWBS: 1.HPC.COM.04.005.045 Waste / Effluent Building (HQA / HQB)	£17	£24
EPRWBS: 1.HPC.COM.04.010 Conventional Island (CI)	£66	£81
EPRWBS: 1.HPC.COM.04.010.005 Turbine Hall	£66	£80
EPRWBS: 1.HPC.COM.04.010.010 Other Conventional Island Buildings	£1	£1
EPRWBS: 1.HPC.COM.04.015 Balance Of Plant (BOP)	£4	£6
EPRWBS: 1.HPC.COM.04.015.005 CW System	£0	£0
EPRWBS: 1.HPC.COM.04.015.010 Other Balance of Plant	£4	£6
EPRWBS: 1.HPC.COM.05 SITE CLEARANCE & RELEASE for REUSE (Activity 05)	**£27**	**£34**
EPRWBS: 1.HPC.COM.05.010 Site Delicencing	£1	£2
EPRWBS: 1.HPC.COM.05.010.005 Power Generation Site Area - Delicensing	£1	£1
EPRWBS: 1.HPC.COM.05.010.010 Transferred ISFS Area of Site - Delicensing	£1	£1
EPRWBS: 1.HPC.COM.05.200 Environmental Management	£26	£32
EPRWBS: 1.HPC.COM.05.200.005 Landscaping of Generating Plant Area of Site	£24	£30
EPRWBS: 1.HPC.COM.05.200.010 Landscaping of Interin Spent Fuel Store Area of Site	£1	£2

Table 5: Hinkley Point C Common Decommissioning and Waste Management Costs Estimate formatted by the EPRWBS

COST CATEGORY	Base Cost (£m)	P80 Cost (£m)
EPR-SITES: 01 HINKLEY POINT C	£5,985	£7,166
EPR-COST ALLOCATION: 01 TECHNICAL MATTER	£0	£0
EPR-CATEGORY: 03 INTERMEDIATE LEVEL WASTE (ILW) MANAGEMENT	£0	£0
EPR-SUB-CATEGORY: 01 Residual Operational Radwaste Management	£0	£0
EPR-CATEGORY: 04 SPENT FUEL (SF)	£0	£0
EPR-SUB-CATEGORY: 01 Residual Operational Radwaste Management	£0	£0
EPR-SUB-CATEGORY: 11 Construction	£0	£0
EPR-COST ALLOCATION: 02 DESIGNATED TECH MATTER	£3,353	£4,320
EPR-CATEGORY: 01 DECOMMISSIONING THE STATION	£1,569	£2,144
EPR-SUB-CATEGORY: 02 Operations after End of Generation	£286	£433
EPR-SUB-CATEGORY: 05 Processing / Encapsulation	£5	£6
EPR-SUB-CATEGORY: 12 Decommissioning	£1,273	£1,700
EPR-SUB-CATEGORY: 14 Planning - Pre-Closure	£3	£4
EPR-SUB-CATEGORY: 15 Planning - During Decommissioning	£0	£1
EPR-CATEGORY: 02 LOW LEVEL WASTE (LLW) MANAGEMENT	£134	£196
EPR-SUB-CATEGORY: 01 Residual Operational Radwaste Management	£0	£0
EPR-SUB-CATEGORY: 02 Operations after End of Generation	£1	£1
EPR-SUB-CATEGORY: 05 Processing / Encapsulation	£14	£18
EPR-SUB-CATEGORY: 07 Transport - Operational	£0	£1
EPR-SUB-CATEGORY: 08 Transport - Decommissioning	£5	£7
EPR-SUB-CATEGORY: 09 Disposal - Operational	£14	£22
EPR-SUB-CATEGORY: 10 Disposal - Decommissioning	£98	£146
EPR-SUB-CATEGORY: 12 Decommissioning	£1	£2
EPR-CATEGORY: 03 INTERMEDIATE LEVEL WASTE (ILW) MANAGEMENT	£58	£84
EPR-SUB-CATEGORY: 01 Residual Operational Radwaste Management	£4	£5
EPR-SUB-CATEGORY: 02 Operations after End of Generation	£12	£14
EPR-SUB-CATEGORY: 05 Processing / Encapsulation	£11	£22
EPR-SUB-CATEGORY: 07 Transport - Operational	£16	£24
EPR-SUB-CATEGORY: 08 Transport - Decommissioning	£6	£8
EPR-SUB-CATEGORY: 10 Disposal - Decommissioning	£9	£11
EPR-SUB-CATEGORY: 12 Decommissioning	£0	£0
EPR-CATEGORY: 04 SPENT FUEL (SF)	£1,537	£1,822
EPR-SUB-CATEGORY: 02 Operations after End of Generation	£653	£744
EPR-SUB-CATEGORY: 05 Processing / Encapsulation	£857	£1,044
EPR-SUB-CATEGORY: 07 Transport - Operational	£16	£19
EPR-SUB-CATEGORY: 11 Construction	£2	£2
EPR-SUB-CATEGORY: 14 Planning - Pre-Closure	£0	£0
EPR-SUB-CATEGORY: 15 Planning - During Decommissioning	£10	£12
EPR-CATEGORY: 05 NON-RADIOACTIVE HAZARDOUS WASTE	£0	£0
EPR-SUB-CATEGORY: 10 Disposal - Decommissioning	£0	£0
EPR-CATEGORY: 06 PLANNING	£55	£73
EPR-SUB-CATEGORY: 14 Planning - Pre-Closure	£21	£28
EPR-SUB-CATEGORY: 15 Planning - During Decommissioning	£34	£44
EPR-COST ALLOCATION: 03 DESIGNATED TECH MATTER (Waste Disposal)	£2,632	£2,847
EPR-CATEGORY: 03 INTERMEDIATE LEVEL WASTE (ILW) MANAGEMENT	£278	£321
EPR-SUB-CATEGORY: 09 Disposal - Operational	£183	£195
EPR-SUB-CATEGORY: 10 Disposal - Decommissioning	£95	£127
EPR-CATEGORY: 04 SPENT FUEL (SF)	£2,355	£2,526
EPR-SUB-CATEGORY: 09 Disposal - Operational	£2,355	£2,526

Table 6: Hinkley Point C Decommissioning and Waste Management Cost Estimate formatted by the EPRCRS

Category	Base Cost (£M)	P80 Cost (£M)
Cost of Pre-closure Planning All DTM tasks that occur prior to Unit 1 EoG (Start of 2083).	**£33**	**£46**
Cost of Decommissioning All costs up to the transfer date with the exception of ILW disposal costs. The date on which activities are no longer categorised as Costs of Decommissioning is taken to be the end of the year in which the Decommissioning End Date falls, i.e. 31/12/2104.	**£1,875**	**£2,550**
Cost of Spent Fuel Management (including post-transfer ILW Disposal) All costs after the transfer date with the exception of spent fuel disposal costs (Note: ILW Disposal after the transfer date is included in this category). The date from which activities are categorised as Costs of Spent Fuel Management is taken to be the end of the year in which the Transfer Date falls, i.e. 31/12/2104.	**£1,451**	**£1,730**
Cost of ILW Disposal (up to transfer date only) ILW disposal costs up to transfer date - 31/12/2104.	**£272**	**£315**
Cost of Spent Fuel Disposal Spent Fuel disposal costs only	**£2,355**	**£2,526**
Total	**£5,985**	**£7,166**

(Note: Costs are rounded to the nearest £1M)

Table 7: Summary of Input Data for FAP

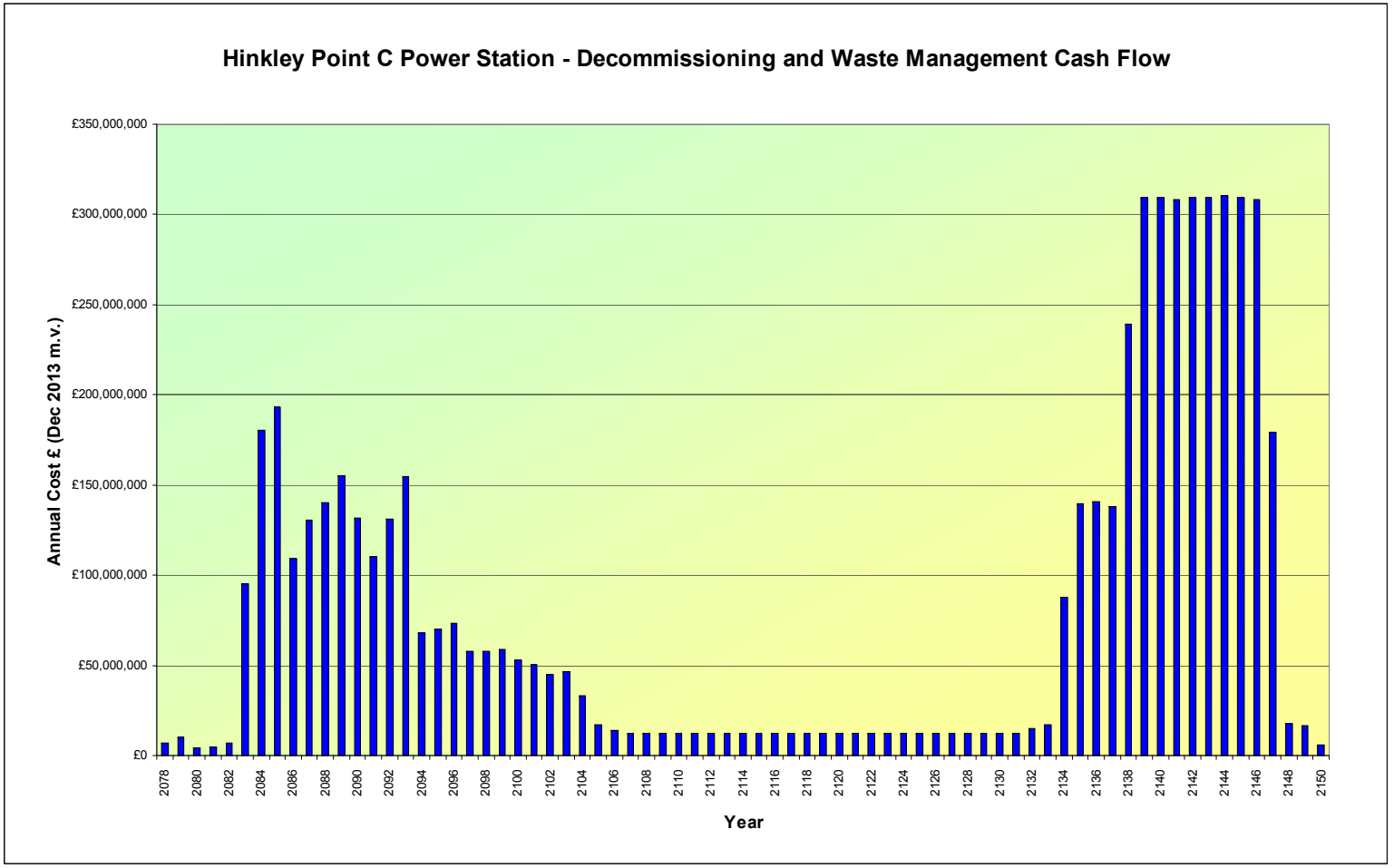


Figure 5: HPC Cash Flow

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7 ASSUMPTIONS & EXCLUSIONS

7.1 FIXED AND NOTIFIABLE ASSUMPTIONS

The FAP specifies a number of Fixed and Notifiable Assumptions upon which the DWMP must be based. Schedule 9 Section 2.3 of the FAP states:

> The Draft DWMP and revised Detailed DWMP prepared by the Operator shall reflect:
>
> - the Fixed Assumptions; and
> - the Notifiable Assumptions (unless the Operator certifies that it has notified the Relevant Regulators of the change to the Notifiable Assumptions and that it has not received any objection to the change in writing from either of the Relevant Regulators).

The FAP Schedule 9 Section 4 sets out these assumptions as:

> The Fixed Assumptions are:
>
> - the regulatory regime that will be applied to waste management and decommissioning at the relevant time will be that in force at the time the DWMP is prepared;
> - during the Operational Period, the final site end state will be such that the Site has been returned to a state agreed with the regulators and the planning authority;
> - cost estimates will be presented on a consistent money of the day basis;
> - decommissioning will be undertaken using equipment and techniques available at the time the DWMP is prepared; and
> - all DTM Costs (but, for the avoidance of doubt, not the operational costs of the second (2nd) Reactor) associated with the operation of the Site after the Decommissioning Start Date and prior to achieving the Site End State will be funded as part of decommissioning activity.
>
> The Notifiable Assumptions are:
>
> - prompt decommissioning of the Site ("early site clearance") will be employed;
> - the operating lifetime of each of the Reactors will be sixty (60) years;
> - low level waste will be dispatched to a disposal facility promptly after generation; and
> - Waste Management and Waste disposal will be carried out in accordance with the arrangements set out in the Waste Transfer Contract.

7.2 KEY ASSUMPTIONS

The following sets out the base case assumptions provided in the FDP Guidance and takes into account the "The Financing of Nuclear Decommissioning and Waste Handling Regulations". In most cases the base case assumptions have been adopted unchanged. Where there are differences, or assumptions are not included within the base case, these are indicated in italics.

In addition, the FAP sets a number of Fixed and Notifiable assumptions as described previously.

The assumptions forming the basis of this DWMP respond to the "Base Case" assumptions, "Fixed Assumptions" and "Notifiable Assumptions" are identified below.

These assumptions cover the "Designated Technical Matters" which are the steps that need to be taken to decommission the installation and clean up the site (which includes the management and disposal of waste) once the reactors have reached the EoG.

:

7.2.1 Regulatory regime

1) The regulatory regime applied to waste management and decommissioning is that in force at the time the FDP was submitted. (fixed assumption)

2) Definitions of waste categories are unchanged from those current at the time the FDP was submitted.

3) Dose limits for workers and the public remain unchanged from those in current use in the UK (set out in the Ionising Radiation Regulations 1999).

7.2.2 Definition of decommissioning and decommissioning costs (fixed assumption)

1) For the purpose of this DWMP, decommissioning at the site is defined to begin at the End of Generation (EoG) Unit 1, when Unit 1 is permanently shut down with no intention of further use for the purpose of generating electricity.

2) For the purposes of this DWMP, decommissioning is defined to end when all station buildings and facilities have been removed and the site has been returned to an end state which has been agreed with the regulators and the planning authority.

3) Costs for decommissioning have been structured to ensure that the costs of management and infrastructure for the station under decommissioning are fully accounted for and separate from costs for other areas of the business.

4) Demolition and disposal of waste management facilities are regarded as part of the decommissioning activity.

5) Certain activities preparatory to decommissioning, such as pre-decommissioning planning, are a Designated Technical Matter and the cost will be met from the FDP.

6) All other costs associated with operating the site after the end of its generating life and until the site licence is surrendered are included as part of the decommissioning activity.

7.2.3 Decommissioning Facilities

1) All facilities on site will be decommissioned in accordance with a structured plan which is acceptable to the regulators which will reduce the hazards presented by the site in a systematic manner.

2) Prompt decommissioning of the power station (Early Site Clearance) is employed for HPC, with safe and secure interim storage facilities for ILW and Spent Fuel. The storage facilities will ensure that the waste stored is compliant with the Waste Transfer Contract arrangements and will be able to meet the GDF operator's conditions for acceptance at the date the waste is packaged. (notifiable assumption)

7.2.4 Care and maintenance

1) The Early Site Clearance Strategy employed for HPC includes the commencement of defuelling and decommissioning as soon as reasonably practicable following EoG with no care and maintenance period.

7.2.5 Site End State

1) The final site end state will be such that all station buildings and facilities have been removed and the site returned to a state agreed with the regulators and the planning authority, which is considered to be consistent with the Base Case assumption of "Similar to Greenfield". For cost estimation purposes the assumption is that the site is restored to a state similar to its state prior to construction. The foundations of the buildings are removed to a depth of 1m below ground level. (fixed assumption)

7.2.6 Cost Calculation

1) The cost estimates are presented on a consistent "money of the year" basis, escalation having been applied as necessary to the source cost estimates to bring the costs in the declared money value. (fixed assumption)

7.2.7 Effect of station design on the Base Case

1) *The basis of this DWMP and associated cost estimate is specific to the HPC site, recognising that a significant proportion is also common to other EPR sites.*

7.2.8 Station Operating Lifetime

1) The assumed operational life for HPC for liabilities planning purposes is 60 years. This departs from the Base Case assumption of a 40 year plant life under the FDP Guidance, but aligns with the FAP. (notifiable assumption)

7.2.9 Decommissioning techniques

1) Decommissioning will be undertaken using equipment and techniques available at the time that this DWMP was prepared. While it is recognised that technical advances may well have a significant impact on the way in which new nuclear power stations are eventually decommissioned, this plan utilises current technology to demonstrate a workable plan for decommissioning and waste management for the site before construction of the station has begun. As part of the Quinquennial Review process technological advancements will be considered and their impact reflected in the plan and associated cost estimates. (fixed assumption)

7.2.10 Management and disposal of ILW (notifable assumption)

1) ILW arising from operations and decommissioning will be stored in safe and secure interim storage facilities on the site of the power station, pending disposal in the same geological disposal facilities to be used for the disposal of ILW from existing nuclear facilities.

2) *The ILW Storage facilities will be constructed as part of the construction of the site, consequently the construction and maintenance of interim stores for ILW during the operation of HPC are NOT a Designated Technical Matter and the cost has NOT been identified in this DWMP*.

3) It is assumed that ILW from operations and decommissioning will be disposed of in accordance with the Waste Transfer Contract which is predicated on disposal of ILW and Spent Fuel in a GDF, and that operational and decommissioning ILW disposal is completed before the "Transfer Date" as defined in section 2b.37 of the FDP Guidance.

4) While NNB GenCo is responsible for estimating the cost of transport of the waste to the GDF, the transfer may be undertaken by a third party, acceptable to the UK regulators, under contract.

5) The arrangements for conditioning and storage of ILW are consistent with those currently acceptable to the UK regulators and ensure that the waste will meet the GDF operator's conditions for acceptance at the date scheduled for its disposal.

6) *It is assumed that the Government will enter into a contract regarding the terms on which it will take title to and liability for the operator's ILW. For the purpose of this baseline DWMP, it is assumed that this occurs on receipt of the ILW at the GDF site, and that the price per m^3 of packaged ILW is at an agreed contracted rate*.

7) Conditioning costs for operational ILW arising before EoG are regarded as operational costs and will not be paid for from the FDP.

8) *Conditioning costs for operational ILW arising after EoG are regarded as decommissioning costs and are identified in this DWMP and will be paid for from the FDP*.

9) Conditioning costs for decommissioning ILW are identified in this DWMP and will be met from the FDP.

7.2.11 Management and Disposal of Spent Fuel (notifiable assumption)

1) For the purpose of this DWMP, it is assumed that uranium oxide fuel is utilised in the reactors. It also assumes that there will be no reprocessing of the uranium fuel, and spent fuel will ultimately be disposed of in a GDF.

2) Spent fuel will be stored in cooling ponds for a period of time, followed by storage in a safe and secure interim store on the site of the power station until decommissioning has been completed and disposal facilities are available to accommodate it. Fuel from the latter stages of the power station's life will have to remain in interim storage on site for some years after the station has ceased generation, because of the need to allow it to cool, before it can be transported and disposed of in a GDF.

3) *The spent fuel storage facilities will be constructed as part of the construction of the site, consequently the construction and maintenance of interim stores for spent fuel during the operation of the power generating plant are NOT a Designated Technical Matter and the cost at HPC is not identified in this DWMP. Following EoG, all costs associated with storage, transport and disposal of spent fuel are a Designated Technical Matter, are evaluated in this DWMP, and will fall to the Fund*.

4) Spent fuel will be disposed of in a GDF under arrangements set out in the Waste Transfer Contract.

5) NNB GenCo is responsible for estimating the costs of transport of the spent fuel to the GDF, although the transfer may be undertaken by a third party, acceptable to the UK regulators, under contract. The basis for this is described in the Waste Transfer Contract as some of these activities will occur after title and liability to waste and spent fuel will have transferred in accordance with the Waste Transfer Contract.

6) It is assumed that the Government will enter into a contract (the "Waste Transfer Contract") regarding the terms on which it will take title to and liability for the operator's spent fuel.

7) *For the purpose of this DWMP, it is assumed that this occurs at the "Transfer Date" on completion of decommissioning of the HPC power generation plant and following the establishment of the ISFS as an independent facility. It is also assumed that the Government enter into a contract rate per tonne uranium for disposal of spent fuel*.

8) *This DWMP assumes that spent fuel will be encapsulated immediately prior to transfer to a GDF. Whilst NNB GenCo do not consider that the provision of an encapsulation plant for each site is a sensible planning assumption it has estimated the costs of providing an encapsulation plant for HPC alone. There is no assumption about the location of such a plant*.

7.2.12 Management and disposal of LLW (notifiable assumption)

1) This DWMP assumes that LLW arising during operation and decommissioning will be packaged on site by the operator and dispatched to a disposal facility promptly after they have been generated. For the purposes of this DWMP, it is assumed that disposal will be at the LLW Repository operating in West Cumbria or a successor facility.
2) It is assumed that LLW will be disposed of in the UK, and that disposal facilities will be available when required, at a price to be agreed between NNB GenCo and the operator of the disposal service. NNB GenCo will meet the costs of managing and disposing of operational LLW prior to EoG. These costs will be met from operational revenues.
3) The costs of managing and disposing of operational type LLW arising after EoG and the costs of disposing of decommissioning LLW are evaluated in this DWMP.
4) *The facilities necessary for the processing and packaging of LLW to comply with the conditions for acceptance of that waste will be available at HPC*.
5) It is assumed that the arrangements for packaging are consistent with those currently acceptable to the relevant UK regulators. NNB GenCo is responsible for transport of the waste to the disposal facility, although the transfer may be undertaken by a third party, acceptable to the UK regulators, under contract.
6) It is assumed that title to the waste will pass to the disposal facility operator when an individual package has been transported to the facility and accepted by the facility operator as meeting the relevant criteria.

7.2.13 Management and disposal of non-radioactive hazardous waste

1) Non-radioactive hazardous wastes arising as a result of operations and decommissioning will be managed according to regulatory requirements and current practices and will be disposed of using established disposal routes.
2) The costs of managing and disposing of non-radioactive hazardous waste from operations will be met from operational revenue.
3) The costs of managing and disposing of non-radioactive hazardous waste from decommissioning are evaluated in this DWMP and will be met from the FDP.

7.2.14 Waste minimisation

1) In establishing its Integrated Waste Strategy (IWS) NNB GenCo has taken steps to ensure that waste volumes and the costs of waste management and decommissioning are limited throughout the station life; for example, by avoidance of production of waste by adherence to the waste hierarchy, minimising the production of primary and secondary wastes consistent with the requirements and expectations of the nuclear and environmental regulators, and through careful segregation of waste arisings. Due account has been taken in determining the IWS and this DWMP of the expectation that new nuclear power stations will meet high environmental standards.

7.2.15 Waste conditioning

1) Waste will be conditioned in a manner and on a timescale which is consistent with current regulatory requirements.

7.2.16 Treatment of wastes arising as a result of station refurbishment

1) Wastes arising as a result of station refurbishment will be managed in the same way as operational wastes and paid for from operational expenditure.

7.3 EXCLUSIONS

The FDP covers certain of the liabilities which have arisen as a result of the operation of HPC during its operational life, the scope of the fund being defined by the Energy Act 2008 and the associated FDP Guidance. The Act defines certain aspects to be Technical Matters, the cost of which is excluded from the Fund, and others as Designated Technical Matters, which are included in the Fund.

The practical interpretation of the above to the scope of the DWMP and the associated liabilities for HPC are presented below.

1) The following are considered to be site construction or operational costs covered by construction investment or operational revenue. That is, these are considered to be Technical Matters which are excluded from the Fund.
   - Operation of the site prior to EoG;
   - ILWISF construction;
   - ILWISF operation prior to EoG;
   - ILW operational waste management operations up to two years before EoG;
   - LLW operational waste management operations up to two years before EoG;
   - LLW operational waste disposal up to two years before EoG;
   - ISFS construction;
   - Spent fuel management and storage operations prior to EoG;
   - The costs incurred by the FDPCo and DECC, and their advisors, in carrying out their duties in relation to the FDP prior to EoG;

2) The following structures shown on the site plan are site construction buildings or structures, which it is assumed will be removed after the end of construction during the sites operational life. They are therefore excluded from the site decommissioning cost.

- Temporary Access Building;
- Construction Medical Centre;
- Construction Canteen;
- Temporary Sewage Treatment Plant;
- Batching Plant;
- Jetty;
- Concrete Laboratory;
- Drill Core Store.

8 DECOMMISSIONING AND WASTE MANAGEMENT COST ESTIMATING PROCESS

This DWMP details the steps to be taken in relation to “Technical Matters” and provides estimates of the costs likely to be incurred in taking steps in relation to “Designated Technical Matters”.

The Estimated Cost for the Decommissioning and Waste Management at HPC is presented at summary level in Section 6, Table 2. This table sets out the current estimate, which was prepared at a detailed level and presented in Section 6, Table 3, Table 4 and Table 5 formatted against the EPRWBS, and the same data formatted against the EPRCRS in Table 6, plus any changes which have been identified subsequently.

This section sets out the processes used in the derivation of the cost estimates and an analysis of the level and source of risk and uncertainty in those estimates. The basis of the methodologies and their application to the HPC cost estimates is further detailed in the DDWMP.

8.1 INTRODUCTION TO THE ESTIMATING PROCESS

The cost estimates for HPC have been structured using the EPRWBS and reported against the EPRCRS as described in Section 4. The latter is closely based upon the structure given in the FDP Guidance and includes some additional codes for internal reporting processes.

At this very early stage in the project, the level of design detail and consequently of the information available for the buildings, facilities, systems and plant is variable. Dependent upon the information available in a particular area, one of four cost estimating approaches has been selected for use. The level at which the estimate is performed is also dependent upon the level of detail of the information available at this stage.

The four estimating methods are:

- Cost Estimation against Scope of Work;
- Cost Factoring;
- Cost Modelling;
- Parametric Cost Estimation.

These methods have been applied across the EPRWBS for estimating a base cost for the decommissioning and waste management (including fuel) for the site.

Selection of method has been based upon:

- Availability of design information and maturity of the scope of work;
- Type of activity;
- Availability of comparable cost estimates to factor costs;

- Actual costs available for similar scope in the parametric estimating tool.

The most appropriate cost estimating technique will be employed for the scope of work for which the estimate is being prepared and the state of development of the decommissioning plan at that time.

The base cost estimate forms the basis of the estimated P80 cost, including estimating uncertainty and risk as described in section 8.2.

8.1.1 Cost Estimation against Scope of Work

Detailed bottom up cost estimates are prepared where sufficient plant information and a well developed scope of work are available. The scope of work is structured using a WBS and this is taken forward for detailed estimate development down to task level.

Each estimated task is costed using a consistent set of estimating rates for labour, plant and materials.

The level of detail specified for all new work undertaken is that it should be at a level of detail which facilitates a full detailed audit, and is capable of being handed over to the site based project team on closure of the site to form the basis of implementation of decommissioning of the site.

During estimate development each discrete task has a triangular distribution developed representing the accuracy of the cost estimate, and to provide an initial input to developing contingency modelling.

8.1.2 Cost Factoring from Estimates for Comparable Scopes of Work

Cost factoring is used to determine a site specific cost by factoring from a cost estimate that has already been undertaken and where the scope of work to be undertaken is sufficiently similar.

The cost estimate used as the basis for the cost factoring should be a good bottom up estimate from a developed scope of work.

In these circumstances, the cost for an existing part of decommissioning based upon a generic cost estimate or a site specific estimate is factored by an appropriate amount from the existing to the new circumstances. The factoring is based upon a key quantity or quantities within the scope which represents a good basis for factoring.

A good example might be a waste store where factoring could be based upon the number of packages that are to be stored.

8.1.3 Cost Modelling

For work that does not have tangible deliverables, usually operational support work, a spreadsheet based cost model is established to produce the cost estimate. Cost modelling can be used for example to determine an estimate for site staffing levels and site overheads, where the costs are modelled as a change from the operational levels as decommissioning progresses.

8.1.4 Parametric Cost Estimation

A parametric cost model is an extremely useful tool for preparing estimates when there are little technical data or engineering deliverables to provide a basis for using more-detailed estimating methods. A parametric model is a mathematical representation of cost relationships that provides a logical and predictable correlation between the physical or functional characteristics of a plant and its resultant cost. Capacity and equipment factored estimates are simple parametric models.

An Excel based spreadsheet model called “PRICEDECONS” has been developed to undertake parametric estimates of decommissioning cost. It calculates the cost as a function of the weight of waste, and the complexity of the decommissioning process including environmental factors. This complexity is a cost metric called “Complexity Factor” which represents a normalised cost density. It is based on the following parameters:

- Type of activity (dismantling, cleaning, demolition)
- Waste classification (conventional, VLLW, LLW, ILW)
- Operating conditions (height, area classification, radiological level, manual or remote operated process)

The Complexity Factor mentioned above is generated from the calibration of the model against actual or contractual costs.

The model calculates firstly the recurring cost of operation (operators’ labour), and second the non-recurring costs which are: project management, engineering, safety, radiological protection, and tooling. The estimation of these non recurring activities requires parameters such as percentage of new procedures, engineering complexity, tooling reuse, etc.

8.2 ESTIMATING CONTINGENCY AND RISK MANAGEMENT

This section describes the process that has been undertaken to produce cost contingencies for HPC. There are two components to the contingency, estimating uncertainty and risk uncertainty. These two components are generally developed separately and then modelled in a Monte Carlo simulation that provides estimates including contingency. The result is a base cost plus contingency figure that is quoted at P80 level for this DWMP.

Two uncertainty and risk analysis methodologies have been employed as part of the HPC DWMP cost estimate development. The first is an interim project specific hybrid process that derives P80 uplift factors by comparison with existing decommissioning plans for NG's (formerly British Energy) power stations already in operation. The second is a conventional risk analysis process using Monte Carlo analysis which has been employed for all spent fuel management activities because these have no equivalent at NG's operational UK power stations. Both of these processes are founded on the same statistical approach to determining the P80 cost as described in following sections.

For this version of the DWMP, all P80 cost estimates associated with spent fuel management have been determined by the statistical methodology. This methodology also forms the basis for the remainder of the P80 estimates where the P80/Base factor is based upon cost estimates for similar decommissioning work scope undertaken for the NG fleet of power stations.

The two processes are shown on the flowchart in Figure 6.

The interim hybrid process occupies much of the chart with the conventional risk analysis process being the exceptional route on the right hand side for use where there is no suitable pre-existing work.

As the HPC plant is still at the planning stage, there are a number of areas where the detailed engineering of the design needs to be developed further. The best information currently available has therefore been used in all cases to prepare a cost estimate which is as robust as possible against this level of knowledge of the plant, and the level of uncertainty applied to the cost estimate reflects this position.

For much of the Nuclear Island, Flamanville 3 Parametric cost estimates have been utilised for the decommissioning of this plant area. The exception is the Primary Circuit for which a detailed bottom up estimate has been carried out because the parametric model is not calibrated for this type of work. For other plant areas existing cost estimates for Sizewell B, Hinkley Point B or Heysham 1 Power Stations have been utilised and suitably adjusted to reflect the comparable HPC plant where appropriate. Finally, new cost estimates have been used for the Fuel Management areas of the costs.

An interim hybrid process has been utilised for the evaluation of the overall level of contingency to be applied to many of the cost estimates, which draws upon the audited good practice employed to estimate the decommissioning costs of the NG fleet of power stations. The use of the process reflects the current status of the HPC project, and ensures that prudent estimates are made for the decommissioning and waste management costs where detailed engineering information is not yet available.

8.2.1 Interim Hybrid Contingency Estimation Process used for part of this DWMP

Where the scope of work is directly comparable to existing work and cost estimates are available from the existing NG fleet, an interim hybrid contingency estimation process has been employed to bridge the gap until the power station is constructed and more detailed information is available. This has facilitated the development of a site specific cost estimate for HPC.

In summary the interim hybrid process uses well developed scopes of work and cost estimates from decommissioning plans, of the existing NG fleet of AGR or PWR power stations, that have been analysed for risk and estimating uncertainty already, and have been subject to external audit. These cost estimates are then factored across to tasks with a similar scope of work for HPC. The ratio of the P80 cost to Base cost for the source cost estimates is calculated, and a risk workshop is held with subject matter experts to determine the appropriate ratio of P80 to base cost to be applied for the equivalent scope of work for HPC.

Adjustments are made in the risk workshop to the overall contingency value where estimating uncertainty, probability and impacts of risks for HPC are considered to be different from the source scope and estimate. These adjustments are performed using a documented process which provides a transparent and auditable basis for calculating the P80/Base factor for HPC. The interim contingency estimation process is set out in Figure 6.

8.2.2 Full, Detailed Statistically Based Contingency Process used for part of this DWMP

For the spent fuel management components of this DWMP, where the scope of work is not directly comparable to any existing work for which a cost estimate has been made in the existing NG fleet, a full Monte-Carlo analysis been performed to generate a P80 contingency.

A full detailed statistical process for determining the overall cost estimating contingency allowance to reflect both the confidence in the cost estimate and the project risk has been utilised within NG for many years. NNB GenCo has utilised a procedure based very closely on the NG process for the spent fuel management components of this DWMP. This full process is described below and is simply illustrated in Figure 7.

8.2.2.1 Estimating Uncertainty

The normal estimating process produces a deterministic estimate to produce a single point estimated figure. This represents the most likely estimated outcome for cost. The quality of the estimate then needs to be determined to produce a further upper and lower point that represents the extremes of uncertainty for the estimated task.

To bring some consistency to this process a set of bands have been developed that classify the estimate from being Class A to Class D, utilising the existing NG classification system, as shown in Table 8, which is closely based upon NDA guidance.

The result is a three point estimate or skewed triangular distribution that is taken forward for uncertainty analysis - see Figure 8.

8.2.2.2 Risk Uncertainty

The process used at existing NG sites and adopted by NNB for the spent fuel management activities in this DWMP takes a holistic approach to determining risk A series of risk workshops are held with input from experts in the field of waste management and decommissioning and other areas which impact the work being considered. The output from these is a series of risk registers, which contain the following key pieces of information taken forward to the uncertainty analysis:

- Risk description.
- Pre and post mitigation probability; this is taken forward as a percentage.
- Pre- and post-mitigation cost impact; this is taken forward as a triangular distribution.

Where the risk analysis at the workshop indicates that the risk level is intolerable, mitigating actions are taken to bring the risk into the acceptable or tolerable range. In the further analysis through the Pertmaster statistical tool described below, the analysis gives costs for both the unmitigated and mitigated risks though generally the mitigated risk is adopted unless a mitigation action which is likely to be successful has been employed, in which case the mitigated risk can be adopted.

8.2.2.3 Uncertainty Analysis

The uncertainty analysis is performed in Primavera Pertmaster uncertainty modelling software. The three point estimate is imported into the software from a Primavera P6 schedule that is fully costed.

The risk uncertainty is brought into the software by importing the risk register containing the information described above.

A risk model is then built allocating risks to activities before the Monte-Carlo analysis is run.

8.2.3 P80 Cost Contingency

The decommissioning site's P80 analysis cost is adopted for nuclear liabilities estimates, with the base cost of any mitigating actions included within the cost estimate, where appropriate.

P80 refers to the confidence level in the base cost plus contingency in achieving a predictable outcome. A P80 figure means that 80% of the time the project/scheme is likely to come in under or on budget and 20% of the time it is likely to overspend. The cost estimates at base and P80 are presented against the EPRWBS and EPRCRS to align with the reporting requirement set out in the FDP Guidance consultation (Ref. 2).

8.2.3.1 P value for use in this version of the DWMP

This DWMP has been prepared for a plant which has not yet been built and will inevitably remain subject to detailed engineering changes. The DWMP therefore represents the best estimate of the decommissioning and waste management costs for the current state of the plant.

Determining levels of estimating uncertainty and project risk for a plant which has yet to be built is especially challenging. Without the detailed engineering input

information on the plant, it is particularly difficult to determine a cost estimate, and then bound this with the likely minimum and maximum values as required for the fully statistical analysis with a high degree of certainty.

Recognising this, NNB has adopted, for this version of the DWMP only, an approach to estimating uncertainty and risk that derives a "p" value by scaling from existing comparable plant and facilities. As described in section 8.2.1, this hybrid approach takes contingency data from the well developed and independently audited decommissioning plans from Sizewell B and the AGR fleet and applies this to Hinkley Point C. This data is then factored, and the risk and contingency levels generally increased, to reflect the lower levels of certainty in the HPC base costs that is inevitable with an unbuilt plant.

The P80 value produced by this exercise is called the "derived P80 value". It does not represent a statistical P80 value, but NNB considers that it provides a robust and conservative estimate for this stage of the development of HPC. In theory, it would be possible to construct a statistical P80 value from the base HPC data. However, based on the currently available level of detail of information, NNB considers that this would require a large number of inevitably subjective assessments to be made. The Monte Carlo analysis performed on the existing HPC data, which is the basis of the statistical approach, would appear to present an accurate result from which a statistical P80 cost can be read, but the result would not be reliable and may result in understating or overstating the level of contingency, without this being apparent.

The derived P80 value will be replaced with a statistical P80 value for the As–Built version of the DWMP and for future quinquennial reviews.

8.2.3.2 Validation of the derived P80 value used in this DWMP

The derived P80 contingency associated with this DWMP using the interim contingency estimation process represents a total uplift of £1,181m above the base estimate.

The HPC derived P80 uplift has been subject to validation through the use of a simple @RISK™ Monte Carlo model using the set of risks generated through review of the HPC risks register set out in DDWMP Annexe C.

The output from the @RISK™ model provides a statistical contingency distribution which can be compared to the HPC "derived" P80 contingency generated through the interim contingency estimating process.

The @Risk™ model calculated a "statistical" P80 contingency of £683m above the base cost, significantly less than the "derived" P80 calculated through the interim hybrid contingency estimation process. This is not unexpected. The @Risk™ model, whilst statistically valid, is based on the risk register contained in the DWMP, which will be developed further as design and construction progresses. This will ensure that the current uncertainties involved in decommissioning a plant which has not yet been built are incorporated into the risk register for the As-Built and future DWMP submissions.

The interim approach to contingency estimation employed by NNB is not fully statistical but it allows a more rigorous approach to be taken by considering the detailed estimating contingency and project risk from Sizewell B and the AGR fleet and factoring these costs across to Hinkley C. Given that, by definition, less is known about Hinkley Point C as it has yet to be built, in the great majority of cases NNB has increased the level of contingency, for like for like activities, in comparison to existing

decommissioning plans for EDF NG sites.

8.2.3.3 Calculation of Estimation Contingency in Future DWMP Submissions

The interim hybrid contingency estimation process was employed to bridge the gap until the power station is constructed and more detailed information is available. For the As-Built DWMP NNB will develop a site specific cost estimate with the use of the full statistical Monte-Carlo process based on the NG process described in Section 8.2.2. This may result in a change in the overall levels of contingency. However, at this stage in the station life there will inevitably be uncertainty about the detailed decommissioning techniques to be employed and therefore significant changes to the overall contingency levels are not expected. As the station nears closure, the size of the contingency would be expected to reduce as certainty in the cost estimate increases as NNB is able to draw upon the developing practical experience of decommissioning in the UK, France and internationally.

8.2.4 Most significant Project Risks

A review of the risks identified and used at the risk workshops to determine the P80 cost estimates has been undertaken to identify those which are most significant in terms of cost impact. Table 9 includes the top ten risks for the decommissioning, waste and fuel management costs for HPC.

The risks utilised in the assessment are a mixture of unmitigated and mitigated risks. Where risks are determined to be at a level which is not tolerable, a mitigating action may be employed to reduce the risk to a tolerable level. If it is concluded that there is a reasonable chance that the mitigating action will successfully reduce the risk, the residual risk is utilised in the further assessment. Where the risk is tolerable, or where the risk cannot be mitigated with confidence, the unmitigated risk is employed. Mitigation may be achieved through normal good management practice, or by inclusion of a specific remedial action in the schedule which incurs additional cost in the base cost estimate.

For the estimation of the Spent Fuel and ILW disposal costs, DECC have provided an “Expected Price” which has enabled the establishment of a prudent estimate for Spent Fuel and ILW disposal costs. No additional estimating uncertainty or risk has been added to waste disposal costs to reflect uncertainty in the rates, as there is already a considerable level of contingency in the rates provided. A risk is however included that the Spent Fuel quantities may be greater than currently estimated.

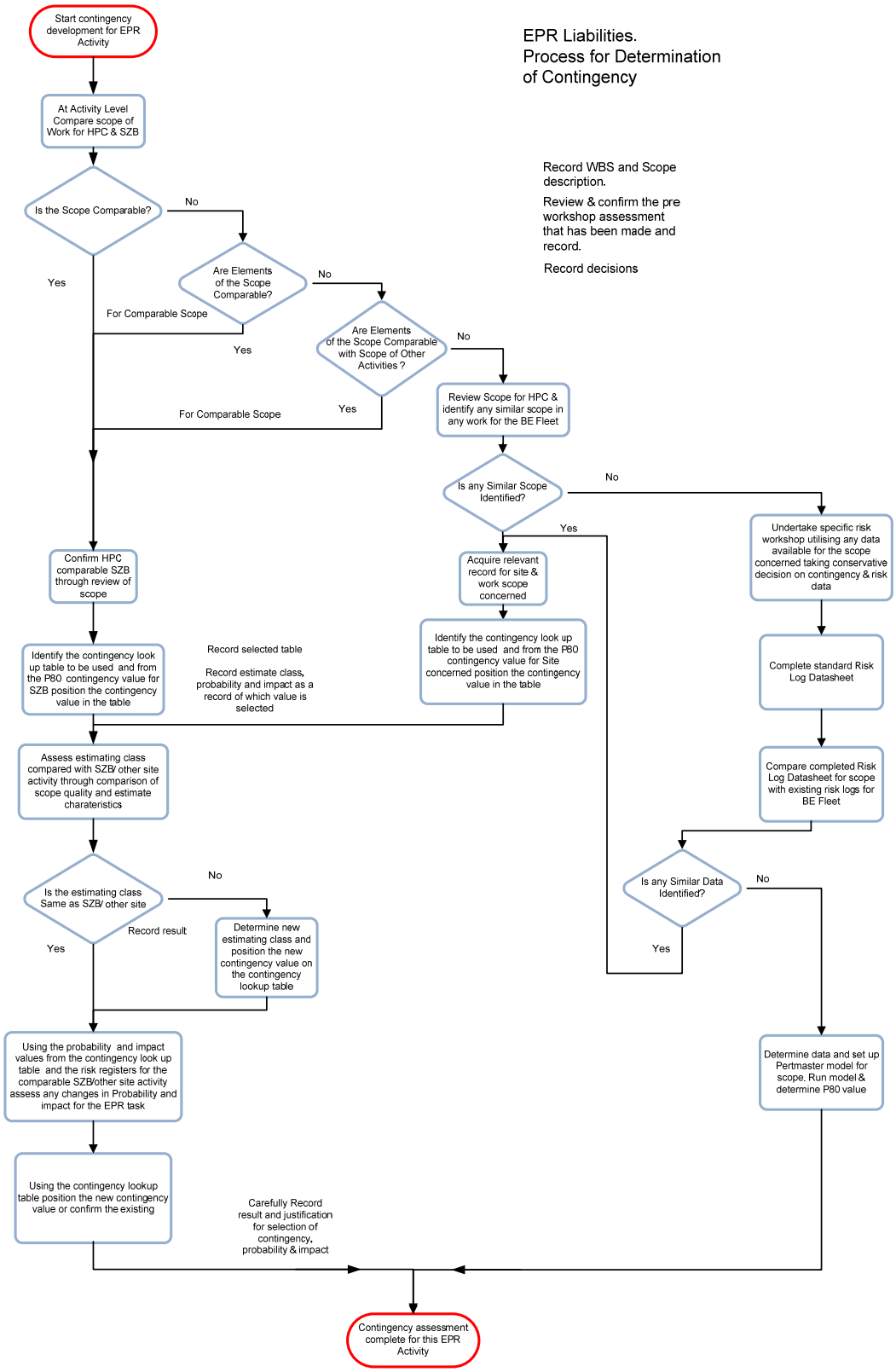

Figure 6 : Interim Contingency Determination Process

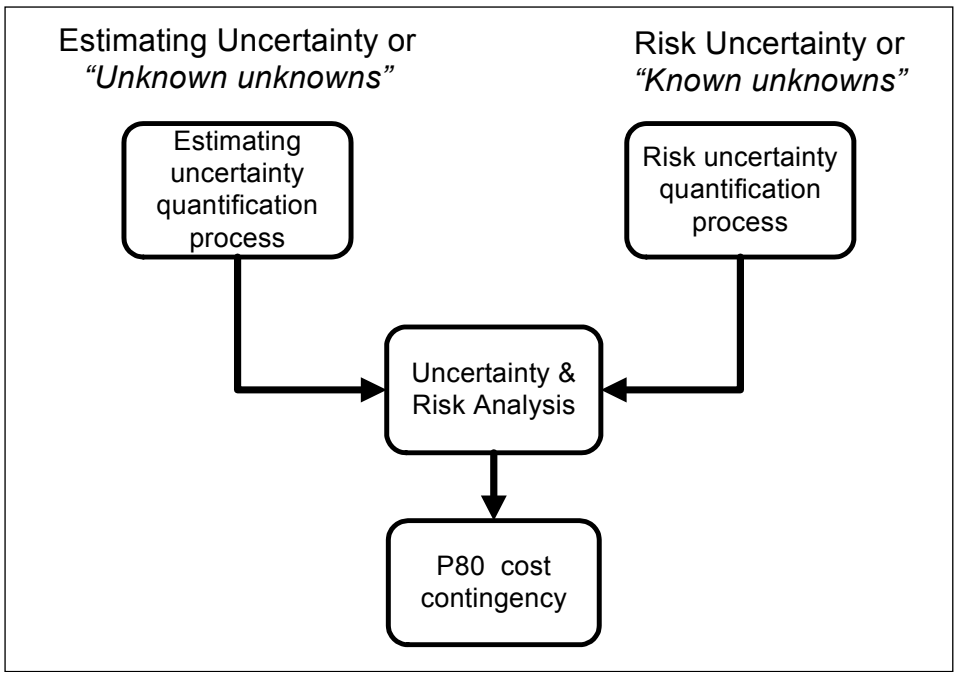

Figure 7 : Uncertainty Analysis Process

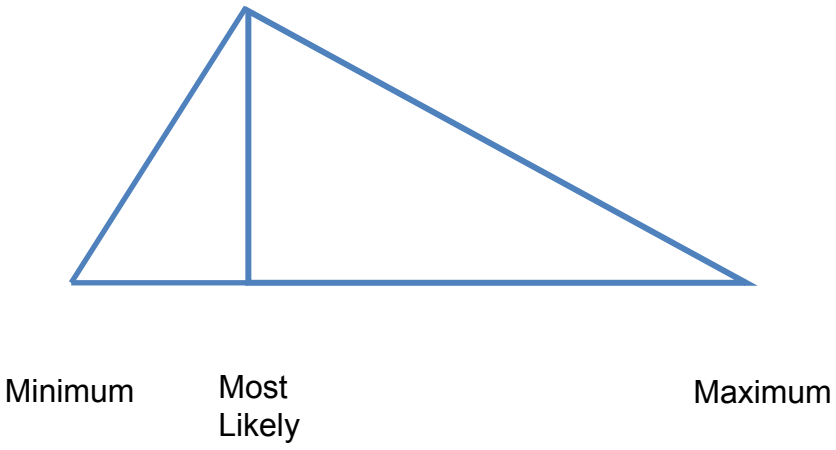

Figure 8: Estimating Uncertainty Distribution

Band	Confidence in Cost Estimate	Uncertainty Range
A	Have done it before. Is supported by evidence from previous project out-turns. No new design or development necessary. Vendor firm price quotations are available against good spec.	+15% / -5%
B	Have done something similar before. No evidence from previous jobs. Minor design changes. Budget quotations, or not fully defined spec.	+30% / -15%
C	Not really done it before, but judge can do it. No evidence Design development necessary Contractors own judgment	+50% / -30%
D	Need to develop the design Not done before	+100% / -30%

Table 8: Estimating Uncertainty Bands

No	Risk Description	Mitigation
1	Site not ready for decommissioning due to unplanned closure or non completion of Pre-Closure preparatory work on time.	Ensure that all levels within NNB GenCo are aware of need for Pre-Closure Planning and its timely delivery, and prepare mitigation strategy and plan at an appropriate time.
2	Delay to the transfer of Spent Fuel from the ISFS to the GDF via the Spent Fuel Encapsulation Plant.	Ensure that the design performance of ISFS and Spent Fuel Encapsulation Plant match the current assumption for fuel acceptance rate at the GDF.
3	Rate of spent fuel arisings is greater than currently estimated in determining the lifetime quantity of spent fuel.	Monitor the rate of fuel arisings at the site, review and re-evaluate the spent fuel schedule and the management and disposal costs.
4	Delay to completion of the Spent Fuel Encapsulation Plant.	Ensure that the design and construction schedule for the Spent Fuel Encapsulation Plant are appropriate, and employ robust project management to ensure availability to programme.
5	Lack of availability of SQEP NNB GenCo and competent supply chain resources.	NNB GenCo will have a resource management plan in place to manage NNB GenCo resources post station closure. External contracts will be announced early, and supply chain assisted with establishment of resources.
6	Site release criteria, standards and end states are more onerous than expected.	Maintain a dialogue with regulators, and reflect cost changes, if any, at Quinquennial Review (QQR)

Table 9: Top Ten Project Risks based upon Cost Impact

No	Risk Description	Mitigation
7	Cooling period for spent fuel in the ISFS increased beyond the liabilities planning basis of 55 years before fuel can be disposed of.	Early establishment of disposability through LoC process, continued review of reactor operations and fuel burn-up with respect to spent fuel thermal characteristics for review at QQR. If required fuel could be packaged 3 per canister. Continue work to establish safety case for commencement of fuel retrieval.
8	Operation of the Spent Fuel Encapsulation Plant does not meet the liabilities planning basis of 200 canisters (800 fuel assemblies) per year.	Appropriate design and testing to ensure plant performance. Learning from similar plant in UK (NDA) and internationally (SKB) which would have already operated at the same proposed rate.
9	Labour and other resource rates increase significantly above indexation.	Work with market to manage the situation. Increased costs to be re-baselined at QQR
10	Decommissioning LLW cannot be disposed of to the LLW disposal facility as programmed.	Maintain dialogue with DECC / NDA / LLWR operator regarding LLWR programme and continued validity of strategic assumption. It may become appropriate to change decommissioning strategy. Modify at QQR if no longer valid.

Table 10: Top Ten Project Risks based upon Cost Impact (Continued)

9 TECHNICAL MATTERS – NON-DESIGNATED

Within the overall scope of the DWMP, there are two areas of the work which are Technical Matters, but which are not classified as Designated Technical Matters. These are described here because they impact technically upon the Designated Technical Matters, and thus aid understanding of the complete picture. They impact only on part of the works under Activity 01 and Activity 03, so the following addresses only these activities.

This section describes those elements of the work scope that are classified as Technical Matters with the cost of performing works attributed to construction cost or to the station operating revenue.

9.1 SPENT FUEL MANAGEMENT – ACTIVITY 01

A number of key Spent Fuel Management activities take place before EoG. These activities take place in support of generation but the facilities continue in use after EoG.

Spent Fuel produced by operation of the reactors will be stored in a purpose designed ISFS constructed on the site. This will store the Spent Fuel until such time as a final repository for spent fuel becomes available and the fuel is considered sufficiently cooled for packaging and disposal at the repository.

9.1.1 Interim Spent Fuel Store Construction

EPRWBS:
Common: 1.HPC.Com.01.015.002. - ISFS Construction

EPRCRS:
Common: 01.01.01.09.04.11.01 – ISFS Construction

The ISFS will be constructed on site commencing during the initial site construction phase. It will be designed to accommodate the full lifetime fuel arisings from both units on site and to store them until packaging and disposal to the GDF is completed.

9.1.2 Fuel Handling from Reactor to Spent Fuel Store during Station Lifetime

EPRWBS: N/A - Not included in schedule.

EPRCRS: N/A - Not included in schedule.

During operation of the site prior to EoG, the costs of operations to transfer spent fuel from the Reactor, its cooling in the Fuel Building Pool and onward transfer to the ISFS, are attributable to the station operating costs.

9.1.3 Interim Spent Fuel Store Operation during Generation

EPRWBS:
Common: 1.HPC.COM.01.015.003

EPRCRS:
Common: 01.01.01.09.04.01.02

All costs associated with the management and operation of the ISFS prior to EoG, are covered by operational revenue.

9.2 MANAGEMENT OF OPERATIONAL WASTES – ACTIVITY 03

How radioactive waste is managed depends to a large extent on how radioactive it is. The categories of radioactive waste defined in the UK are set in Appendix 1.

A number of radioactive waste forms are generated and treated throughout the generating life of the EPR. These include:

- Ion exchange resins (used to minimise soluble radioactive material and which arise as either ILW or LLW dependent on the system in which they are used);
- Spent filters (used to remove particulate from liquid and ventilation systems, and may be ILW or LLW dependent on the system from which they arise);
- Dry active waste and metals (generated through routine and maintenance operations throughout the Nuclear Island; small components may be ILW, but mainly arises as LLW);
- Tank sludge (arises as particulates settle out in tanks from liquid waste treatment systems and is expected to be ILW or LLW);
- Evaporator concentrates (arise from evaporation for the minimisation of radioactive liquid effluents and is expected to be LLW).

9.2.1 Operational LLW Packaging and Disposal Prior to EoG

EPRWBS: N/A - Not included in schedule.

EPRCRS: N/A - Not included in schedule.

During operation, the packaged LLW will be transferred for treatment or disposal to an appropriately permitted facility as soon as practicable. Costs associated with the retrieval, processing, packaging, transport and disposal of LLW wastes prior to EoG will be met from site operating revenue.

9.2.2 Operational ILW Interim Storage Facility Construction and Operation prior to EoG

EPRWBS: Common: 1.HPC.Com.03.020.005

EPRCRS: Common: 01.01.01.09.03.01.02

Waste retrieval, processing and storage facilities will be built during site construction to be available early in the station's operational lifetime. The ILWISF will safely store all operational ILW arising from the two EPR units, each operating for 60 years, and any additional ILW that may be generated from the operation of the ISFS prior to EoG. The capacity of the ILWISF is currently based on the estimated total number of ILW packages without taking the opportunity of employing radionuclide decay and re-classification of short lived waste from ILW to LLW during storage. As this will enable the disposal of the LLW during operation at the site, the total number of packages requiring storage is reduced, thus the current basis of the store size is considered to be bounding. Initial calculations performed within Generic Design Assessment (GDA) suggest that a significant proportion of packages could be re-categorised as LLW and disposed of after a period of interim storage.

The facility will provide interim storage for operational ILW generated at HPC until the GDF is available to accept the waste for disposal.

The HPC ILW strategy for prompt packaging of waste that will be disposed of as ILW requires that the ILWISF is available to accept waste packages early in the operational life of the station. The costs associated with construction of this facility will be part of the initial site construction cost.

The operation and maintenance of the facility during the generating life of the station is a Technical Matter covered by operating revenue. Following EoG, the operation and maintenance will be reclassified as a Designated Technical Matter - refer to Section 4.4.3.

9.2.3 Operational ILW Packaging Prior to EoG

EPRWBS: N/A - Not included in schedule

EPRCRS: N/A - Not included in schedule

Operational ILW arising during operation will be processed, packaged and transferred to the ILWISF. The packaged ILW will remain in the ILWISF awaiting the availability of the GDF to take the wastes. The retrieval, processing and packaging activities will be funded via operating revenue and are Technical Matters.

A proportion of ILW arising from the operation of the UK EPR will be dominated at the time of arising by relatively short lived radio-nuclides. After a period of safe interim storage, the radioactivity of this waste will have decayed to such levels that the waste would no longer be classified as ILW. This would present the opportunity to manage the waste as LLW.

A strategy of decay storage, where suitable waste is not conditioned in the final disposal containers at the time of arising but is stored safely and compliantly until it is introduced into the LLW management process, will:

- reduce the overall radioactive volume of radioactive waste produced by the site;
- reduce the burden on UK LLW disposal facilities as, unlike conditioned waste which could only be disposed of to a LLW repository, it would be possible to minimise disposal volumes through segregation and pre-treatment prior to transfer to a range of LLW treatment and disposal facilities;
- aid compliance with UK legislation and best waste management practice; and
- reduce radioactive waste disposal costs to the operator.

A key component of the NNB GenCo operational ILW strategy will therefore be the utilisation of decay storage of unencapsulated non-mobile waste where it is can be demonstrated to represent BAT and complies with storage safety requirements.

The cost of the above will fall to operational revenue, but has the potential for significant savings in the cost of ILW disposal which will occur after EoG and which is a Designated Technical Matter. This potential saving in the waste disposal costs has not been included in the current cost estimates.

Processing materials which will become ILW Wastes arising from the final two years of generation are assumed to be still in the plant and will be managed after EoG as will the subsequent 5 years of operational type wastes which arise during decommissioning. These are classified as Designated Technical Matters - refer to Section 4.4.2.

10 REFERENCES AND DEFINITIONS

Ref	Title	Author
1	Energy Act, November 2008	DECC
2	Energy Act 2008 - Consultation on revised Funded Decommissioning Programme Guidance for New Nuclear Power Stations, DECC, December 2010	DECC
3	NNB GenCo Funding Arrangements Plan	NNB GenCo EDRMS
4	UK Government. The Nuclear Decommissioning and Waste Handling (Designated Technical Matters) Order 2010. 2010 No. 2850.	DECC
5	NNB GenCo. EPR Corporate Decommissioning Strategy and Plan. NNB-PEA-STR-000001 Rev.03.	NNB GenCo EDRMS
6	HSE Nuclear Directorate. HSE Criterion For Delicensing Nuclear Sites. May 2005.	ONR
7	The Tolerability of Risk from Nuclear Power Stations. 1992.	ONR
8	HSE. Reducing Risks Protecting People: HSE's Decision Making Process. 2001.	ONR
9	Hinkley Point C Detailed Decommissioning and Waste Management Plan. Rev. 4.0. May 2014	NNB GenCo EDRMS

Term / Abbreviation	Definition
ALARP	As Low As Reasonably Practicable
BAT	Best Available Techniques
BNI	Balance of Nuclear Island
CW	Cooling Water
DECC	Department of Energy and Climate Change
DDWMP	Detailed Decommissioning and Waste Management Plan
DWMF	Decommissioning Waste Management Facility
DWMP	Decommissioning and Waste Management Plan
EDF	Électricité de France
EIADR	Environmental Impact Assessment for Decommissioning Regulations
EoG	End of Generation
EPR	The Pressurised Water Reactor developed and trademarked by AREVA

Term / Abbreviation	Definition
EPRWBS	EPR Work Breakdown Structure
EPRCRS	EPR Cost Reporting Structure
ESC	Early Site Clearance
FAP	Funding Arrangement Plan
FDP	Funded Decommissioning Programme
FDPCo	The Nuclear Decommissioning Fund Company Ltd
Fund	Funding Arrangements established under the terms of the FDP
GDA	Generic Design Assessment
GDF	Geological Disposal Facility
GIS	Gas Insulated Switchgear
HLW	High Level Waste
HPC	Hinkley Point C
ILW	Intermediate Level Waste
ILWISF	Intermediate Level Waste Interim Storage Facility
ISFS	Interim Spent Fuel Store
IWS	Integrated Waste Strategy
LLW	Low Level Waste
LoC	Letter of Compliance
MAETP	Mobile Active Effluent Treatment Plant
MMMF	Man Made Mineral Fibre
NDA	Nuclear Decommissioning Authority
NG	EDF Energy Nuclear Generation (formerly British Energy)
NI	Nuclear Island
NNB GenCo	Nuclear New Build Generation Company
NSSS	Nuclear Steam Supply System
ONR	Office for Nuclear Regulation
PCD	Primary Circuit Decontamination
PWR	Pressurised Water Reactor
RWMD	Radioactive Waste Management Directorate
SF_6	Sulphur Hexafluoride
SZC	Sizewell C Power Station
Transfer Date	means the date, or schedule of dates, upon which the Operator's responsibility for managing the waste pending disposal will transfer to the Government.
LLW	Very Low Level Waste

11 TABLES

EPRWBS	DESCRIPTION
1	EDF ENERGY NNB GenCo NUCLEAR FLEET
1.HPC	HINKLEY POINT C
1.HPC.U1	UNIT 1
1.HPC.U1.00	PRE CLOSURE PREPARATORY WORK (Activity 0)
1.HPC.U1.01	FUEL MANAGEMENT (Activity 01)
1.HPC.U1.01.015	Reactor Defuelling and Fuel Despatch
1.HPC.U1.01.015.005	Fuel Removal Operations from Reactor
1.HPC.U1.01.015.010	Fuel Storage in Cooling Pond
1.HPC.U1.01.015.015	Fuel Transfer from Fuel Building Pond to Spent Fuel Interim Storage Facility
1.HPC.U1.02	SITE OPERATION & PLANT PREPARATION (Activity 02)
1.HPC.U1.02.001	Making Safe Redundant Systems & Plant
1.HPC.U1.02.001.000	Non Maintenance Group Specific
1.HPC.U1.02.003	Primary Circuit Decontamination (PCD)
1.HPC.U1.02.003.005	PCD Engineering Design
1.HPC.U1.02.003.010	PCD Installation and Commissioning
1.HPC.U1.02.003.015	PCD Operations
1.HPC.U1.02.003.025	PCD Waste Management
1.HPC.U1.02.045	Site Plant Maintenance during Decommissioning
1.HPC.U1.02.045.020	During Plant Decommissioning
1.HPC.U1.02.050	Plant Operations During Decommissioning
1.HPC.U1.02.050.020	During Plant Decommissioning
1.HPC.U1.03	MANAGEMENT OPERATIONAL WASTES (Activity 03)
1.HPC.U1.03.005	Retrieval, Processing, Transport and Disposal
1.HPC.U1.03.005.005	ILW Operational Waste
1.HPC.U1.03.005.010	LLW Operational Waste
1.HPC.U1.04	PLANT & REACTOR DECOMMISSIONING (Activity 04)
1.HPC.U1.04.005	Nuclear Island (NI)
1.HPC.U1.04.005.005	Reactor Building
1.HPC.U1.04.005.010	Fuel Building
1.HPC.U1.04.005.015	Safeguard Buildings
1.HPC.U1.04.005.025	Nuclear Auxiliary Building
1.HPC.U1.04.005.035	Other Nuclear Island Buildings
1.HPC.U1.04.005.040	Access Building
1.HPC.U1.04.005.045	Waste / Effluent Building (HQA / HQB)
1.HPC.U1.04.005.050	Backup Diesels
1.HPC.U1.04.005.055	Functional Simplification
1.HPC.U1.04.005.060	New Works
1.HPC.U1.04.005.065	Dismantling Preparation
1.HPC.U1.04.005.070	Nuclear Island Demolition Support
1.HPC.U1.04.005.075	Nuclear Island Dismantling Secondary Wastes
1.HPC.U1.04.010	Conventional Island (CI)
1.HPC.U1.04.010.005	Turbine Hall
1.HPC.U1.04.010.010	Other Conventional Island Buildings
1.HPC.U1.04.015	Balance Of Plant (BOP)
1.HPC.U1.04.015.005	CW System
1.HPC.U1.04.015.010	Other Balance of Plant

Table 10: EPRWBS Coding for Hinkley Point C Unit 1

EPRWBS	DESCRIPTION
1	EDF ENERGY NNB GenCo NUCLEAR FLEET
1.HPC	HINKLEY POINT C
1.HPC.U2	UNIT 2
1.HPC.U2.00	PRE CLOSURE PREPARATORY WORK (Activity 0)
1.HPC.U2.01	FUEL MANAGEMENT (Activity 01)
1.HPC.U2.01.015	Reactor Defuelling and Fuel Despatch
1.HPC.U2.01.015.005	Fuel Removal Operations from Reactor
1.HPC.U2.01.015.010	Fuel Storage in Cooling Pond
1.HPC.U2.01.015.015	Fuel Transfer from Fuel Building Pond to Spent Fuel Interim Storage Facility
1.HPC.U2.02	SITE OPERATION & PLANT PREPARATION (Activity 02)
1.HPC.U2.02.001	Making Safe Redundant Systems & Plant
1.HPC.U2.02.001.000	Non Maintenance Group Specific
1.HPC.U2.02.003	Primary Circuit Decontamination (PCD)
1.HPC.U2.02.003.010	PCD Installation and Commissioning
1.HPC.U2.02.003.015	PCD Operations
1.HPC.U2.02.003.025	PCD Waste Management
1.HPC.U2.02.045	Site Plant Maintenance during Decommissioning
1.HPC.U2.02.045.020	During Plant Decommissioning
1.HPC.U2.02.050	Plant Operations During Decommissioning
1.HPC.U2.02.050.020	During Plant Decommissioning
1.HPC.U2.03	MANAGEMENT OPERATIONAL WASTES (Activity 03)
1.HPC.U2.03.005	Retrieval, Processing, Transport and Disposal
1.HPC.U2.03.005.005	ILW Operational Waste
1.HPC.U2.03.005.010	LLW Operational Waste
1.HPC.U2.04	PLANT & REACTOR DECOMMISSIONING (Activity 04)
1.HPC.U2.04.005	Nuclear Island (NI)
1.HPC.U2.04.005.005	Reactor Building
1.HPC.U2.04.005.010	Fuel Building
1.HPC.U2.04.005.015	Safeguard Buildings
1.HPC.U2.04.005.025	Nuclear Auxiliary Building
1.HPC.U2.04.005.035	Other Nuclear Island Buildings
1.HPC.U2.04.005.040	Access Building
1.HPC.U2.04.005.045	Waste / Effluent Building (HQC)
1.HPC.U2.04.005.050	Backup Diesels
1.HPC.U2.04.005.055	Functional Simplification
1.HPC.U2.04.005.060	New Works
1.HPC.U2.04.005.065	Dismantling Preparation
1.HPC.U2.04.005.070	Nuclear Island Demolition Support
1.HPC.U2.04.005.075	Nuclear Island Dismantling Secondary Wastes
1.HPC.U2.04.010	Conventional Island (CI)
1.HPC.U2.04.010.005	Turbine Hall
1.HPC.U2.04.010.010	Other Conventional Island Buildings
1.HPC.U2.04.015	Balance Of Plant (BOP)
1.HPC.U2.04.015.005	CW System
1.HPC.U2.04.015.010	Other Balance of Plant

Table 11: EPRWBS Coding for Hinkley Point C (Unit 2)

EPRWBS	DESCRIPTION
1	EDF ENERGY NNB GenCo NUCLEAR FLEET
1.HPC	HINKLEY POINT C
1.HPC.COM	COMMON PLANT
1.HPC.COM.00	PRE CLOSURE PREPARATORY WORK (Activity 0)
1.HPC.COM.00.001	Strategic Review and Decommissioning Plan Development
1.HPC.COM.00.015	Environmental Impact Statement
1.HPC.COM.00.020	National & Local Planning Permission
1.HPC.COM.00.025	Article 37 Submission
1.HPC.COM.00.045	Revise Station Maintenance Schedule
1.HPC.COM.00.050	Revise Discharge Authorisations
1.HPC.COM.00.060	Programme Management Development
1.HPC.COM.00.060.010	Preliminaries
1.HPC.COM.00.060.020	Integration Workstreams
1.HPC.COM.00.060.030	Workstreams Tranche 1
1.HPC.COM.00.060.040	Workstreams Tranche 2
1.HPC.COM.00.070	Pre-Closure Planning Staffing Requirements
1.HPC.COM.00.200	Environmental Monitoring programme
1.HPC.COM.00.200.010	Environmental Monitoring (CODE TBC)
1.HPC.COM.01	FUEL MANAGEMENT (Activity 01)
1.HPC.COM.01.015	Reactor Defuelling and Fuel Despatch
1.HPC.COM.01.015.020	Convert ISFS for Autonomous Operation
1.HPC.COM.01.015.022	Relicense Autonomnous ISFS
1.HPC.COM.01.015.025	Interim Spent Fuel Store Operation
1.HPC.COM.01.015.030	Spent Fuel Transport and Disposal
1.HPC.COM.01.015.035	Interim Spent Fuel Store Decommissioning
1.HPC.COM.01.015.037	Spent Fuel Encapsulation Facility Planning (FULL COST TO HPC)
1.HPC.COM.01.015.040	Spent Fuel Encapsulation Facility Construction (FULL COST to HPC)
1.HPC.COM.01.015.045	Spent Fuel Encapsulation Facilty Operation (FULL COST TO HPC)
1.HPC.COM.01.015.050	Spent Fuel Encapsulation Facility Decommissioning (FULL COST TO HPC)
1.HPC.COM.02	SITE OPERATION & PLANT PREPARATION (Activity 02)
1.HPC.COM.02.010	Activity 2 Staffing Levels
1.HPC.COM.02.030	New Decommissioning Electrical Supply & Electrical Distribution System (DSEDS)
1.HPC.COM.02.030.010	New Decommissioning Site Incoming Electrical Supply (DSIES)
1.HPC.COM.02.030.020	New Decommissioning Site Electrical Distribution System (DSEDS)
1.HPC.COM.02.035	Active Waste Treatment System
1.HPC.COM.02.035.040	New Effluent Discharge Arrangements
1.HPC.COM.02.100	Site Overheads
1.HPC.COM.02.100.020	Site Management & Arrangements, Facilities, Services and Admin
1.HPC.COM.02.100.030	Operations and Project Support to Decommissioning
1.HPC.COM.02.100.050	Records & Knowledge Management for Decommissioning
1.HPC.COM.02.100.070	Programme Management and Controls
1.HPC.COM.02.100.080	Site Staff Redundancy costs
1.HPC.COM.02.100.200	Environmental Management
1.HPC.COM.02.200	Corporate Support Costs
1.HPC.COM.02.200.010	Corporate Staff Support
1.HPC.COM.02.200.020	Regulatory Costs
1.HPC.COM.02.200.030	Civil Nuclear Constabulary Costs
1.HPC.COM.02.200.040	Fundco Operating Costs
1.HPC.COM.02.200.050	DECC Charges
1.HPC.COM.02.200.070	Insurance Costs During Decommissioning & Spent Fuel Management
1.HPC.COM.03	MANAGEMENT OPERATIONAL WASTES (Activity 03)
1.HPC.COM.03.020	ILW Interim Storage Facility (ILW ISF)
1.HPC.COM.03.020.015	ILWISF - Store Emptying
1.HPC.COM.03.020.020	Interim Waste Storage - Decommission & Demolition
1.HPC.COM.03.025	Active Waste Treatment Systems
1.HPC.COM.03.025.060	Mobile AETP
1.HPC.COM.04	PLANT & REACTOR DECOMMISSIONING (Activity 04)
1.HPC.COM.04.005	Nuclear Island (NI)
1.HPC.COM.04.005.045	Waste / Effluent Building (HQA / HQB)
1.HPC.COM.04.010	Conventional Island (CI)
1.HPC.COM.04.010.005	Turbine Hall
1.HPC.COM.04.010.010	Other Conventional Island Buildings
1.HPC.COM.04.015	Balance Of Plant (BOP)
1.HPC.COM.04.015.005	CW System
1.HPC.COM.04.015.010	Other Balance of Plant
1.HPC.COM.05	SITE CLEARANCE & RELEASE for REUSE (Activity 05)
1.HPC.COM.05.010	Site Delicencing
1.HPC.COM.05.010.005	Power Generation Site Area - Delicensing
1.HPC.COM.05.010.010	Transferred ISFS Area of Site - Delicensing
1.HPC.COM.05.200	Environmental Management
1.HPC.COM.05.200.005	Landscaping of Generating Plant Area of Site
1.HPC.COM.05.200.010	Landscaping of Interin Spent Fuel Store Area of Site

Table 12: EPRWBS Coding for Hinkley Point C (Common Plant)

	Fleet	Site	Cost Allocation	Unit	Category	Sub-Category	Function	Notes
NNB Fleet	01							
Site	01 .	xx						
Hinkley Point C (HPC)	01 .	01						
Sizewell C (SZC)	01 .	02						
Technical Matter or Designated Tech Matter			. XX					
Technical Matter	01 .	01	. 01					[2]
Designated Tech Matter	01 .	01	. 02					
Designated Tech Matter (Waste Disposal)	01 .	01	. 03					
Unit				XX				
Unit 1	01 .	01	. XX	. 01				
Unit 2	01 .	01	. XX	. 02				
Common or Site	01 .	01	. XX	09				[1]
Decommissioning the Station					01	. 00	00	
New Construction for Decommissioning	01 .	01	. 02	. XX	. 01	. 12	01	
Decommissioning Processes / Operations	01 .	01	. 02	. XX	. 01	. 12	03	
Low Level Waste (LLW) Management					02	. 00	00	
Operational LLW retrieval, processing, packaging, during operational life T0 to T60	01 .	01	. 01	. XX	. 02	. 01	04	[2,3]
Operational LLW disposal during operation al life T0 to T60	01 .	01	. 01	. XX	. 02	. 01	06	[2,3]
Operational LLW retrieval, processing, packaging, transport from T60 to T65	01 .	01	. 02	. XX	. 02	. 02	04	
Operational LLW disposal from T60 to T65	01 .	01	. 02	. XX	. 02	. 02	06	
Decommissioning LLW processing, packaging.	01 .	01	. 02	. XX	. 02	. 12	04	
Transport of decommissioning LLW for disposal.	01	01	02	XX	02	08	05	
Decommissioning LLW disposal.	01 .	01	. 02	. XX	. 02	. 10	06	

Table 13: EPRCRS Coding for Hinkley Point C

	Fleet	Site	Cost Allocation	Unit	Category	Sub-Category	Function	Notes
Spent Fuel (SF)					04	00	00	
Spent Fuel Interim Storage Facility construction	01	01	01	XX	04	11	01	[4]
Operation of ISFS during the generating life of station	01	01	01	XX	04	01	02	[5]
Conversition of ISFS to stand alone Facility at EoG	01	01	02	XX	04	02	01	
Operation & maintenance of ISFS after EoG	01	01	02	XX	04	02	02	
Transport of SF for disposal	01	01	02	XX	04	07	05	
Encapsulation of SF for disposal	01	01	02	XX	04	05	00	
Construction of Spent Fuel Encapsulation Plant	01	01	02	XX	04	05	01	[6]
Operation of Spent Fuel Encapsulation Plant	01	01	02	XX	04	05	02	[6]
Decommissioning of Spent Fuel Encapsulation Plant	01	01	02	XX	04	05	03	[6]
Disposal of all SF	01	01	03	XX	04	09	06	
Non-radioactive hazardous waste					05	00	00	
Management & disposal of non-radioactive hazardous waste during operation	01	01	01	XX	05	01	06	
Management & disposal of non-radioactive hazardous waste during decommissioning	01	01	02	XX	05	03	06	
Planning					06	00	00	
Decommissioning planning before start of generation	01	01	01	XX	06	13	00	
Pre-closure planning	01	01	02	XX	06	14	00	
Any planning carried out during decommissioning	01	01	02	XX	06	15	00	
Other Costs					07	00	00	
All other costs associated with operating the site until end of its generating life.	01	01	01	XX	07	03	02	
All other costs associated with operating the site after end of its generating life.	01	01	02	XX	07	04	02	

Table 14: EPRCRS Coding for Hinkley Point C (Continued)

Sub Category Key

Code	
01	Operational T0 - T60
02	Operational T60 +
03	Other Cost T0 - T60
04	Other Cost T60 +
05	Encapsulation
06	Packaging
07	Transport - Operational
08	Transport - Decommissioning
09	Disposal - Operational
10	Disposal - Decommissioning
11	Construction
12	Decommissioning
13	Planning - Decommissioning Planning before start of generation
14	Planning - Pre-closure
15	Planning - During Decommissioning
16	Operation and Emptying

Function Key

Code	
00	N/A
01	Construction
02	Operation
03	Decommissioning
04	Packaging
05	Transport
06	Disposal

This cost reporting coding structure is closely based upon the FDP Guidance Document, with some additional codes for internal reporting purposes.

[1] Used for Facilities Common to both units or site wide services or off site facilities

[2] Coding against Technical matters is for internal use only.

[3] It is assumed that the volumes of operational waste which arise in years 59 & 60 are actually managed / disposed after EoG, so become Designated Technical Matters.

[4] Site Construction Cost so cost not reported - internal use only

[5] Site Operational Cost so is a Technical Matter - Cost not reported - internal use only

[6] This level of detail is for internal use only.

Table 14: EPRCRS Coding for Hinkley Point C (Continued)

Appendix 1 – Definition of UK Radioactive Waste Categories

The categories of radioactive waste defined in the UK at the time of preparation of this DWMP are set out below:

- Low Level Waste (LLW) - This comprises materials from routine operations and decommissioning with primarily low concentrations of beta/gamma contamination, but may include small amounts of alpha contaminated material. In the UK LLW may be treated and disposed of through a variety of routes including the national LLW Repository (the LLWR), via commercial incinerators, other treatment facilities, or in certain cases to specific approved landfill (see below). Some LLW which is not suitable for disposal within the LLWR would be stored until the national Geological Disposal Facility (GDF) is available. In the UK, LLW is defined as waste with a radioactive content exceeding 400kBq in any $0.1m^3$ and 40kBq per article (unless the activity is due to carbon-14 or tritium, in which case the limits are a factor of ten greater) but not exceeding 4GBq/te of alpha radioactivity or 12GBq/te of beta/gamma radioactivity.
- Very Low Level Waste (VLLW) - A sub-set of LLW is categorised as Very Low Level Waste (VLLW) which consists of the least radioactive component of the LLW category and may therefore be suitable for alternative disposal or treatment routes. VLLW from nuclear power stations would be classed as High-volume VLLW and could be disposed of to specified approved landfill sites. The waste would be subject to controls on its disposal which would be specified by the Environment Agency.
- Intermediate Level Waste (ILW) - Waste containing higher concentrations of beta/gamma contamination and sometimes alpha emitters. There is little heat output from this category of waste. These wastes usually require remote handling. Such waste comes from routine power station maintenance operations, for example used ion exchange resin and filter cartridges. ILW generated during power station operations would be stored in purpose built facilities which may, if necessary, incorporate shielding to protect operators from radiation. Some ILW is treated as it arises to put it into a more inert, passively safe, form. This is known as conditioning. In the UK, ILW is defined as waste with a radioactive content exceeding that of LLW but which does not require heat dissipation to be taken into account in the design of storage or disposal facilities.
- High Level Waste (HLW) - Waste containing high concentrations of alpha/ beta/gamma emitting radio-nuclides. HLW only arises from nuclear fuel reprocessing operations and therefore would not be generated during operations at HPC. HLW generated during reprocessing of spent fuel requires remote handling (due to the radiation levels) and cooling (due to the heat produced) for many years. In the UK, HLW is defined as waste in which the temperature may rise significantly as energy is released by radioactive decay, so this factor has to be taken into account in designing storage or disposal facilities.
- Spent Fuel - Spent fuel from nuclear power stations is not categorised as waste because it still contains uranium and plutonium which could potentially be separated out through reprocessing and used to make new fuel.

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NNB-PEA-REP-000009
Revision 4.0

NNB Generation Company Limited

Hinkley Point C Power Station

Decommissioning and Waste Management Plan

Revision 4.0

Annexe A1 - Summary Cash Flow for Funding Arrangement Plan (FAP) Base and P80

By: Huw Widgery

Date: 16/05/14

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HINKLEY POINT C DWMP Rev 4.0. ANNEXE 1 - SUMMARY FUNDING ARRANGEMENTS PLAN CASH FLOW

(Costs in December 2013 m.v.)

Schedule Dataset May 2014

Key Definitions:	Note: Costs are rounded to the nearest £1M
1: Cost of Pre-closure Decommissioning Planning	The Cost of Pre-closure Decommissioning Planning – All DTM tasks that occur prior to Unit 1 EoG (Start of 2083).
2: Costs of Decommissioning	All costs up to the transfer date with the exception of ILW disposal costs. The date on which activities are no longer categorised as Costs of Decommissioning is taken to be the end of the year in which the Decommissioning End Date falls, i.e. 31/12/2104.
3: Costs of Spent Fuel Management	All costs after the transfer date with the exception of spent fuel disposal costs (Note: ILW Disposal after the transfer date is included in this category). The date from which activities are categorised as Costs of Spent Fuel Management is taken to be the end of the year in which the Transfer Date falls, i.e. 31/12/2104.
4: Costs of ILW Disposal	ILW disposal costs up to transfer date - 31/12/2104
5: Costs of Spent Fuel Disposal	Spent Fuel disposal costs only

DWMP Revision 4.0 - Base Costs (£m)

CATEGORY	Base Cost Total	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095
1: Cost of Pre-closure Decommissioning Planning	£33	£7	£10	£5	£5	£7	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
2: Costs of Decommissioning	£1,875	£0	£0	£0	£0	£0	£57	£110	£127	£97	£114	£125	£141	£118	£97	£121	£155	£68	£70
3: Costs of Spent Fuel Management	£1,451	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
4: Costs of ILW Disposal	£272	£0	£0	£0	£0	£0	£39	£70	£66	£12	£16	£15	£15	£13	£13	£10	£0	£0	£0
5: Costs of Spent Fuel Disposal	£2,355	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
Total	£5,985	£7	£10	£5	£5	£7	£95	£181	£193	£109	£130	£140	£155	£132	£110	£131	£155	£68	£70

Decommissioning End Date from DWMP schedule falls on 14/05/2104
The date on which activities are categorised as Cost of Spent Fuel Management is taken to be the end of the year in which the Transfer Date falls, i.e. 31/12/2104.

Years 2110 to 2115 have been selected as a representative continuous period of five financial periods used to calculate the Additional Storage Amount

CATEGORY	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114
1: Cost of Pre-closure Decommissioning Planning	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
2: Costs of Decommissioning	£73	£58	£58	£59	£53	£50	£45	£47	£33	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
3: Costs of Spent Fuel Management	£0	£0	£0	£0	£0	£0	£0	£0	£0	£17	£14	£12	£12	£12	£12	£12	£12	£12	£12
4: Costs of ILW Disposal	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
5: Costs of Spent Fuel Disposal	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
Total	£73	£58	£58	£59	£53	£50	£45	£47	£33	£17	£14	£12	£12	£12	£12	£12	£12	£12	£12

CATEGORY	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133
1: Cost of Pre-closure Decommissioning Planning	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
2: Costs of Decommissioning	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
3: Costs of Spent Fuel Management	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£15	£17
4: Costs of ILW Disposal	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
5: Costs of Spent Fuel Disposal	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
Total	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£12	£15	£17

CATEGORY	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150
1: Cost of Pre-closure Decommissioning Planning	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
2: Costs of Decommissioning	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
3: Costs of Spent Fuel Management	£88	£139	£141	£138	£88	£52	£52	£51	£52	£52	£52	£52	£51	£37	£17	£16	£6
4: Costs of ILW Disposal	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
5: Costs of Spent Fuel Disposal	£0	£0	£0	£0	£151	£258	£258	£257	£258	£258	£259	£258	£257	£142	£0	£0	£0
Total	£88	£139	£141	#REF!	£239	£309	£309	£308	£309	£309	£311	£309	£308	£179	£17	£16	£6

DWMP Revision 4.0 - P80 Costs (£m)

CATEGORY	P80 Cost Total	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095
1: Cost of Pre-closure Decommissioning Planning	£46	£10	£14	£6	£6	£10	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
2: Costs of Decommissioning	£2,550	£0	£0	£0	£0	£0	£78	£161	£185	£133	£155	£171	£190	£161	£129	£162	£208	£91	£94
3: Costs of Spent Fuel Management	£1,730	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
4: Costs of ILW Disposal	£315	£0	£0	£0	£0	£0	£41	£82	£78	£14	£19	£18	£17	£16	£16	£12	£0	£0	£0
5: Costs of Spent Fuel Disposal	£2,526	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
Total	£7,166	£10	£14	£6	£6	£10	£118	£243	£263	£146	£174	£189	£207	£177	£145	£174	£208	£91	£94

Decommissioning End Date from DWMP schedule falls on 14/05/2104
The date on which activities are categorised as Cost of Spent Fuel Management is taken to be the end of the year in which the Transfer Date falls, i.e. 31/12/2104.

Years 2110 to 2115 have been selected as a representative continuous period of five financial periods used to calculate the Additional Storage Amount

CATEGORY	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114
1: Cost of Pre-closure Decommissioning Planning	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
2: Costs of Decommissioning	£98	£77	£78	£79	£73	£69	£60	£60	£40	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
3: Costs of Spent Fuel Management	£0	£0	£0	£0	£0	£0	£0	£0	£0	£20	£16	£14	£14	£14	£14	£14	£14	£14	£14
4: Costs of ILW Disposal	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
5: Costs of Spent Fuel Disposal	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
Total	£98	£77	£78	£79	£73	£69	£60	£60	£41	£20	£16	£14	£14	£14	£14	£14	£14	£14	£14

CATEGORY	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133
1: Cost of Pre-closure Decommissioning Planning	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
2: Costs of Decommissioning	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
3: Costs of Spent Fuel Management	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£18	£20
4: Costs of ILW Disposal	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
5: Costs of Spent Fuel Disposal	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
Total	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£14	£18	£20

CATEGORY	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150
1: Cost of Pre-closure Decommissioning Planning	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
2: Costs of Decommissioning	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
3: Costs of Spent Fuel Management	£106	£169	£171	£168	£106	£62	£62	£62	£62	£62	£62	£62	£62	£45	£21	£20	£7
4: Costs of ILW Disposal	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
5: Costs of Spent Fuel Disposal	£0	£0	£0	£0	£162	£276	£276	£275	£276	£276	£278	£276	£275	£153	£0	£0	£0
Total	£106	£169	£171	£168	£268	£338	£338	£337	£338	£338	£340	£338	£337	£197	£21	£20	£7

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