Bord Gáis Energy

Whitegate Independent Power Plant (WIPP)

Update of Decommissioning Management Plan (DMP) 2021

REP/1

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Document Verification

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Contents

Appendices

Summary of Decommissioning Management Plan

Introduction

The 2014 decommissioning management plan was prepared in accordance with Condition 10.2 of the IE Licence and was approved by the Agency in August 2014. In accordance with Condition 10.2.2 of the Industrial Emissions (IE) Licence an annual review of the Decommissioning Management Plan (DMP) has been undertaken.

The objective of the plan is clean closure. The methodology for the development of the report follows EPA guidance and has been carried out by an independent and appropriately qualified consultant.

The total closure and decommissioning costs for the worst-case scenario have been calculated as €2,569,618.27, including contingency (ex VAT).

In July 2014, Bord Gáis Energy was sold to Centrica plc in a single share purchase agreement. Centrica has made the necessary financial provisions to cover any liabilities incurred during decommissioning by means of a Parent Company Guarantee which was finalised in May 2016.

Centrica plc is a public company registered in England and Wales which is listed on the official list of the UK Listing Authority and traded on the main market of the London Stock Exchange under the ticker CNA. Centrica has a current market capitalisation of approximately £18 billion. In addition, Centrica's credit rating is BBB+ (negative outlook) from Standard & Poor's and Baa1 (stable) from Moody's.

Activity Details

Activity:	Whitegate Independent Power Plant
Owner:	Bord Gáis Energy
Operator:	General Electric Operation & Maintenance
Address:	Whitegate (Corkbeg and Glanagow townlands), Co Cork
	Licence number P0830-02
Activity licensed:	Class 2.1 Combustion of fuels in installations with a total rated thermal input of 50MW or more.
RBME Category:	B3

Report Preparation

This decommissioning management plan has been updated by Celine Doody (Bord Gáis Energy, EHS) and reviewed by Oliver Caherty (Bord Gáis Energy, Operations).

Review

This decommissioning management plan will be reviewed annually and any changes will be submitted to the EPA for approval in the Annual Environmental Report.

1 Introduction

1.1 Site Description and Activity

The Whitegate Independent Power Plant (WIPP) consists of a nominal 450 Megawatt Combined Cycle Gas Turbine (CCGT) power plant, located on circa 10ha (25 acres) of land in Whitegate (Corkbeg and Glanagow townlands), Co. Cork.

The WIPP power plant is owned by Bord Gáis Energy (BGE). General Electric Operation & Maintenance (GE) operates and maintains the plant on a day to day basis on behalf of BGE. Figure 1 presents the WIPP site layout.

The plant commenced operations in November 2010.

1.2 Licence Details

The Environmental Protection Agency (the Agency) issued BGE with an Integrated Pollution Prevention and Control licence in April 2009, licence number P0830-01. The licence was partially reviewed in 2012 and licence P0830-02 was issued October 2012. The Agency made a technical amendment to the licence in December 2013 to bring it into compliance with the industrial emissions directive. The licence is now an industrial emissions licence (IE).

The licensed activity is:

Class 2.1 Combustion of fuels in installations with a total rated thermal input of 50MW or more.

Condition 10 of the IE Licence imposes requirements for decommissioning planning, as follows:

"Condition 10 Decommissioning & Residual Management

10.1 Following termination, or planned cessation for a period greater than six months, of use or involvement of all or part of the site in the licensed activity, the licensee shall, to the satisfaction of the Agency, decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein, that may result in environmental pollution.

10.2 Decommissioning Management Plan:

10.2.1 The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for the decommissioning or closure of the site or part thereof.

10.2.2 The plan shall be reviewed annually and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the agreement of the Agency.

10.2.3 The licensee shall have regard to the Environmental Protection Agency *Guidance on Environmental Liabilities Risk Assessment,*

Residuals Management Plans and Financial Provision when implementing condition 10.2.1 above.

10.3 The Decommissioning Management Plan shall include as a minimum, the following: -

(i) A scope statement for the plan;

(ii) The criteria which define the successful decommissioning of the activity or part thereof, which ensures minimum impact on the environment;

(iii) A programme to achieve the stated criteria;

(iv) Where relevant, a test programme to demonstrate the successful implementation of the decommissioning plan; and

(v) Details of the costings for the plan and the financial provisions to underwrite those costs.

10.4 A final validation report to include a certificate of completion for the Decommissioning Management Plan, for all or part of the site as necessary, shall be submitted to the Agency within three months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.

The Decommissioning Management Plan (DMP) was submitted to the Agency in September 2009. In March 2013, the Agency notified BGE that the DMP had been assessed and there were a number of matters which should be noted or actioned. An updated DMP was submitted to the Agency and approved in August 2014. This revision of the DMP is to fulfil the IE Licence requirement to undertake an annual review.

1.3 Planning Permission Requirements

The planning permissions, obtained from Cork County Council authorising the development of the site and the activity, do not impose any requirements in relation to decommissioning management. However, condition number one of the initial planning permission for the WIPP project, planning file reference 06/10126, required the development to be undertaken in accordance with the plans and particulars submitted in the planning application. These included an environmental impact statement, Whitegate Independent Power Plant Environmental Impact Statement, August 2006. The environmental impact statement gave the following undertaking:

"3.11 Provision for Decommissioning

The Whitegate IPP has a projected life span of approximately 30 years. At the end of the 30 year life cycle, there will be several options available for the proposed development. The first option could see the plant being redeveloped for further power generation, with the upgrading of plant and machinery and supporting infrastructure. This option would have no environmental impact on the locality.

A further option, decommissioning of the plant, will be implemented, should circumstances arise whereby it becomes necessary to shut down the facility. This will ensure that any negative environmental impact is minimised. All plant and machinery and supporting infrastructure can easily be disconnected and removed for appropriate disposal, and the site returned to development potential with no environmental issues associated with the site. The decommissioning programme will include:

- *Removal of any chemicals or wastes stored on site. Any oils, lubricants or fuels that are on site at the time of closure will be recycled/disposed of through appropriate registered contractors.*
- *Plant equipment and machinery will be emptied on ceasing operations, dismantled and stored under suitable conditions until it is sold, or if a suitable buyer cannot be located, recycled/disposed of through appropriate licensed waste disposal contractors.*
- *The plant buildings will be subject to thorough house cleaning procedures prior to final evacuation.*
- *The site and buildings will be left in a secure manner and appropriate security maintained on site in the event of the site potentially being vacant for an extended period of time.*
- *If the site is being permanently vacated it will be returned to its current use.*
- *There will be no asbestos used in the construction of the facility so its removal during decommissioning will not arise.*

A detailed decommissioning plan will be submitted to the Environmental Protection Agency as part of the application for an IPPC licence."

The EIS provision for decommissioning is less onerous that the 'worst case' provided for in this DMP and no additional costs arise.

1.4 Methodology

The preparation of this update has had regard to the EPA's "*Guidance on assessing and costing environmental liabilities*, 2014.

This report has been prepared based on data compiled from information provided by BGE and GE, site processes and environmental operations, the 2006 Environmental Impact Statement, and recent Annual Environmental Reports and site compliance data.

The review takes into account operations on the site and includes identification of existing and potential hazards including environmental liabilities which are detailed in the Environmental Liabilities Risk Assessment (which was also approved by the EPA in August 2014, June 2018 and July 2021).

1.5 Closure Scenarios Covered in the Plan

It is BGE's intention to lead the decommissioning of the WIPP plant, should the need arise and any such decommissioning would be undertaken with due care and diligence in order to reduce or eliminate the risk to the environment during and after decommissioning activities. However the Agency requires the worst case scenario to be examined and costed. Consequently the costings for this DMP update are based on the assumption that external contractors will implement the decommissioning. The costs have been reviewed for 2021 in line with the Consumer Price Index (CPI) as issued by the Central Statistics Office (https://www.cso.ie/en/interactivezone/visualisationtools/cpiinflationcalculator/)

In order to develop a fully detailed and costed DMP, it is necessary to make a number of assumptions regarding the future decommissioning of the WIPP plant. This DMP has been developed with the following assumptions:

- BGE considers it likely that the date for closure of the facility will be well known in advance of the activation of the DMP. However, as required by the Agency, the DMP update has been prepared on the assumption that the closure will be unplanned.
- Unless stated otherwise, all plant and equipment will assume scrap value.
- It is BGE's aim that all stored fluids or solid materials, be they chemicals, gases, greases or oils would be returned to suppliers where appropriate.
- 'Disposal Off-Site' shall mean that licensed removal contractors, licensed removal equipment and licensed reception facilities' will be utilised where required during the DMP.
- 'Disposal Off-Site' shall mean that a full record and log will be maintained of all plant, equipment, finished or raw materials and fluids removed off site.
- All above ground structures and equipment will be removed.
- All contractors engaged in the DMP shall be fully licensed, experienced and approved to undertake the activities for which they are engaged.
- Environmental monitoring as per the IE licence conditions will continue while the DMP is in operation.
- On conclusion of the DMP, the site will achieve a status of not posing a risk to public health or the environment.

2 Site Evaluation

2.1 Operator Performance

2.1.1 Environmental Management System

BGE and the Operator manage environmental issues associated with the Facility through an appropriately designed Environmental Management System (EMS), to ensure compliance with the IPPC licence and all other applicable environmental legislation that the Facility is subject to. The facility was certified to ISO 14001:2015 in April 2016 and continues to maintain this certification.

The EMS is designed, implemented, operated and managed in a manner that satisfies the requirements of ISO 14001 and ensures the following objectives are achieved:

- Compliance with EPA IE licence conditions and all other legislation that will from time to time govern the operation of the Facility.
- Compliance with GE Environmental Policy.
- Minimisation of environmental risks.
- Prevention of pollution.
- Ensure energy efficiency is maximised.
- All facility staff, stakeholders and shareholders are made aware of and support the highest of environmental standards for the facility.

EMS Design Structure

The EMS is designed along the following structure as outlined by ISO 14001.

Plan-Do-Check-Act

- Plan: establish the objectives and processes necessary to deliver results in accordance with the company's environmental policy.
- Do: implement the process.
- Check: monitor and measure processes against environmental policy, objectives, targets, legal and other requirements, and report the results.
- Act: take action to continually improve performance of the environment management system.

2.1.2 Compliance History

The plant achieved full compliance with its then IPPC licence in 2010.

There was an exceedance of the emission limit for BOD in wastewater in November 2011. Results from an external laboratory indicated a level of BOD of 40mg/l, which was in excess of the licence limit of 20mg/l. Tests showed that the source of the problem was a heat exchanger which had leaked causing migration of contaminated water to the raw water tank. All contaminated material from the Effluent Treatment Plant (ETP) was taken off site via road tankers until the BOD level reduced to below the licence limit.

In 2012 there was one breach of the limits on emissions to air. One recorded hourly average of nitrogen oxides (NO_X) was 264mg/m^3 which was slightly in excess of the then IPPC licence limit of 240 mg/m^3. This occurred during testing of the plant.

In 2012 also one breach of the emission limits for emissions to water occurred. During discharge of one batch of treated process water the suspended solids (SS) concentration was recorded as 43mg/l which was in excess of the licence limit of 30mg/l. It was found that discharge from SW1 occurred while the air blowers were in operation.

This raised the suspended solids concentration in the basins. Trials showed that when the air blowers were switched off a dramatic reduction in the SS concentration.

In 2013 an auto-sampler failed, which did not have significant environmental consequences.

In 2015, there was a malfunction of TOC analyser and a malfunction of the CEMS equipment. Both events were notified to the EPA and neither had significant environmental consequences. Also, in 2015, the EPA issued a notification of non-compliance in relation to condition 5.2 of the IE Licence in relation to noise nuisance.

In 2016, there was a malfunction of the CEMS equipment. This event was notified to the EPA and did not have an environmental consequence. Also in 2016, the EPA issued a non-compliance in relation to condition 12.2.3 in relation to financial provisions to cover any liabilities.

In 2017, the CEMS report showed an hourly exceedance for CO as the CEMS system included values below minimum generation in the hourly summation values. Also in 2017 the autosampler failed an alternative sampling arrangements were put in place while repairs were made.

In 2018, the data card which transmits information to the CEMS regarding the turbine status failed.GE was unable to print out normal daily reports for the period 24 to 26 September. All data that was recorded by the CEMS and was retrievable.

In 2019, there were four separate instances where there were CEMS malfunctions. These took place in February, April (x2) and May. All data that was recorded by the CEMS and was retrievable. The EPA were notified of each event using Eden.

In 2020, there were three separate instances where there were CEMS malfunctions. These took place in March, September and October. All data that was recorded by the CEMS and was retrievable. The EPA were notified of each event using Eden. In October, the site was issued with a non-compliance following an emission limit value (ELV) exceedance for BOD.

The plant was in outage for the majority of 2021 and there are no compliance issues to report.

2.1.3 Enforcement History

No enforcement actions were taken against BGE arising from the operation of WIPP.

2.1.4 Incident History

Refer to the compliance history above. In addition, in 2012 there was an uncontrolled release of reject water from the raw water treatment plant due to a leak from the drain which connects the raw water treatment plant to the effluent treatment plant.

In 2013 an auto-sampler failed, which did not have significant environmental consequences. In 2015, there was a malfunction of TOC analyser and two instances of a malfunction of the CEMS equipment. Both events were notified to the EPA and neither had significant environmental consequences.

In 2016, there was a malfunction of the CEMS equipment and the EPA was notified. There were no significant environmental consequences.

In 2017, there were two incidents where there were small leaks (distillate and caustic). In both instances the leaks were contained in bunds.

In 2018, there were three incidents where there were small leaks (lift oil, lube oil, hydrochloric acid). In all instances the leaks were contained.

In 2020, there was an incident whereby the stormwater basin discharged to SW2 and it was realised subsequently that TOC was not being monitored correctly. In July there was a small leak of HCl and this was contained. In August, a small quantity (0.95kg) of SF6 gas escaped to atmosphere. This leak was within the ESB compound and the equipment is under the control and ownership of the ESB.

In 2021, there was a small leak of oil inside the lube oil tank reservoir. The leak was contained and cleaned up.

2.1.5 Complaints History

The site received a total of 11 complaints in 2010, seven of which related to noise, two related to air and two related to light pollution. There were no complaints in 2011. There was one noise complaint in 2012 arising from the Graball Bay area of Cork Harbour. The incident was investigated and the source of the noise identified and rectified. Historically it should be noted that some of the noise complaints recorded at the site were not attributable to site operations.

There were no complaints in 2013 and 2014.

In 2015, there were four noise complaints made to the EPA from residents in the Graball Bay area of Cork Harbour. The EPA issued a notice of non-compliance against condition 5.2 of the IE Licence.

In 2016, a noise complaint was made to the EPA from a local resident. In June 2016 a noise attenuation programme was completed on site.

In 2017, a complaint was made by a local resident regarding an air plume. This was not attributed to the site.

In 2018 there were 2 No. complaints. The complaint in January was related to a plume of steam. The complaint in May was related to vibration. Neither was found to be attributable to operations on site.

There were no complaints in 2019, 2020 or 2021.

2.1.6 Monitoring and/ or Site investigations Carried Out

The WIPP plant is located on circa 10ha (25 acres) of land in the control of Bord Gáis Energy and adjacent Whitegate oil refinery, IE licence P0266-02. The site of the power plant is under the legal control of BGE.

Figure 2 shows the site location in relation to the oil refinery.

Prior to August 2007, the site of the WIPP power plant was primarily green field land within the boundary of the oil refinery. No buildings, structures, plant or equipment were built or located on this land.

Historically, there were documented cases of land filling and waste disposal activities on the site. These were addressed under the oil refinery's IPPC licence, P0266-01.

In August 2007, BGE leased and assumed legal control over the site formerly within the boundary of the adjacent oil refinery for the purposes of the WIPP. At that time the area was still within the boundary of the refinery's IPPC licence. During site clearance, in late 2007 and early 2008, two areas of oil contaminated soil and oily waste material were uncovered on the WIPP site. These were fully remedied under a landfill decommissioning plan approved by the Agency. A clean-up target concentration of 2,500mg/kg mineral oil in soil was approved. The validation testing, undertaken as part of the landfill decommissioning plan, determined that all material, with a mineral oil level in excess of this, was removed. Validation reports were submitted to the Agency on completion of the works. This work was carried out under the refinery's IPPC licence.

Apart from some groundwater contamination issues addressed under the refinery IPPC licence, further site investigations undertaken for the WIPP construction project showed no detections of contamination.

Groundwater monitoring undertaken in accordance with the WIPP IE licence during 2012 and 2013 has detected hydrocarbons in some of the groundwater wells. A joint investigation was completed between BGE and Philips 66 (now Irving Oil) on foot of a compliance investigation issued by the EPA. The report on this investigation was submitted in June 2015. The EPA issued a response in July 2015 indicating that they consider the compliance investigation closed and that reports on bi-annual monitoring should continue to be submitted to them for assessment. The timing of the bi-annual monitoring is aligned with Irving Oil and the results of analysis are shared by both parties.

2.2 Environmental Pathways and Sensitivity

2.2.1 Underlying Geology and Hydrogeology

2.2.1.1 Soils and Geology

The Geology of South Cork (UCC 1988) indicates that the site is underlain by Upper Devonian sandstones and siltstones of the Kiltorcan Formation (Ballyknock Member). To the north of the site, in the area crossed by the access road, the bedrock is formed of sandstones and siltstones of the Old Head Formation (Glanagow and White Bay Members) and slate of the Castle Slate

Formation. The bedrock is highly folded in the area. The bedrock is overlain by between one and five metres of glacial till. The glacial till is generally described as silty sandy clay and clayey silt with gravel.

2.2.1.2 Hydrogeology

The hydrogeological data for the site indicate that the ground water flows mirror the surface topography and surface drainage. The groundwater flows into the site towards the Glanagow stream from the north and east, from the main part of the oil refinery, and from the west, from the farmland. In the site groundwater also flows towards the stream.

2.2.1.3 Groundwater Vulnerability

The groundwater in the vicinity of the site is designated by the GSI as a Locally Important (Li) aquifer, moderately productive in local zones, and with an extreme vulnerability rating (E). Refer to the GSI web site www.gsi.ie.

2.2.2 Proximity To Surface Water Bodies, Their Classification And Status

The site and the adjacent oil refinery are on a ridge, with the ground falling away steeply to the northwest, to the shore of Cork Harbour. The southern part of the site falls to the southwest to the valley of the Glanagow stream.

2.2.2.1 Glanagow Stream

The Glanagow stream rises in the oil refinery, just to the east of the site, and crosses the site on a south-westerly course. The south-western part of the refinery and the land to the south drain to the stream. The eastern and northern parts of the refinery drain eastwards and northwards respectively and are not in the stream's catchment.

The stream has been realigned and culverted where it crosses the WIPP site. The WIPP site has been graded in a series of terraces, which generally drain to the stream.

The portion of the Glanagow stream, within the refinery and within the site, runs dry in a spell of fine weather.

Beyond the site boundary the stream runs southwards through farmland to enter the sea at White Bay beach.

2.2.2.2 Cork Harbour

The site is located close to the shores of Cork Harbour. To the southwest of the site, the Harbour entrance is at Roches Point and the entrance channel is approximately one kilometre wide, between Ram's Head and Dognose, close to the site. Northwards of this point the Harbour opens out to give a large body of sheltered water, into which several rivers flow and in which several islands are located. There are extensive mud banks and shallows in the Harbour, which provide valuable habitat for wildlife, particularly birds.

The Harbour has a twice daily tidal cycle with a range of approximately 4m in spring tides. The tide runs quickest through the narrows between Ram's Head and Dognose and the speed reduces away from the narrows.

Currently, sewage from the Lower Harbour towns and villages of Whitegate / Aghada, Saleen, Crosshaven, Carrigaline, Ringaskiddy, Cobh, Monsktown and Passage West is discharged untreated into the Harbour.

Lower Cork Harbour is designated as coastal and estuarine. The water quality in the Harbour has a moderate biological status and fails to achieve a good chemical status, as reported in the South Western River Basin District Management Plan 2009 - 2015. This is due to winter levels of dissolve inorganic nitrogen in the Upper Harbour from diffuse agricultural sources in the tributary river catchments.

2.2.3 Proximity to Sensitive Receptors, Including Humans

The nearest occupied dwelling to the site is 750 metres from the site boundary. Dairy farming is carried out on lands adjoining the site to the south and southwest, within 50 metres of the activity footprint. The adjoining land to the west and northeast are in industrial use. Beyond the oil refinery to the north is an area of woodland which extends to the shores of the Harbour. The intertidal mud flats, located approximately 1km to the northeast of the site, between the causeway to Corkbeg Island and Whitegate village, are designated as part of the Cork Harbour Special Protection Area, site code 4030.

2.2.4 Details Of The Nearest Habitat, SAC, SPA, NHA

The intertidal mud flats, located approximately 1km to the northeast of the site, between the causeway to Corkbeg Island and Whitegate village, are designated as part of the Cork Harbour Special Protection Area, site code 004030. The mud flats are also designated as the Whitegate Bay pNHA, site code 001084.

2.2.5 List Of Emission And Discharge Points

A2-1 Main Stack

A3-1 Emergency Generator

A4-1 Gas AGI creep relief valve

A4-2 Gas treatment skid relief valve

A4-3 Gas turbine gas cabinet block and bleed valve

A4-4 Turbine lubricating oil skid vapour extraction

A4-5 Fuel gas heater relief valves

A4-6 Refinery off gas relief valve

A4-7 Supplementary firing block and bleed valve

A4-8 Spill from distillate storage tanks

SW1 – Process Effluent discharge

SW2 – Surface water drainage discharge to Glanagow Stream

2.2.6 Neighbouring Developments

The Irving Oil refinery, IE licence P0266-03, is located adjacent to the WIPP site, to the north and northeast. The Calor LPG depot is located to the west of the WIPP entrance road.

2.2.7 Environmental Pathways

The potential pathways through which the activity could impact on the surrounding environment are:

- An undetected spill or leak of a hazardous substance from bunded storage.
- An undetected leak from an in-ground drain.
- An accidental release of natural gas.
- An emission to air exceeding the licensed limits.
- A discharge of surface water to the Glanagow Stream or of treated process effluent to the Harbour, exceeding the licensed limits.

2.3 Site Processes and Activities

The following section provides a brief description of the operation of the WIPP plant.

2.3.1 Plant Operations

The plant is designed for fully automatic single button start and control from a Central Control Room (CCR). The power plant control system is designed for continuous 24 hour operations. The WIPP plant is of a single shaft configuration, i.e. one gas turbine, one generator and one steam turbine all coupled together on one shaft centreline. The WIPP plant utilises the following process:

- A gas turbine burning natural gas is coupled on one main shaft, which rotates at high speed, to a generator (alternator) which produces electricity.
- Exhaust gases from the gas turbine passes through a heat recovery steam generator (HRSG) to generate steam.
- The steam generated in the HRSG drives a steam turbine, which is also coupled to the generator (alternator) to increase electrical power output.
- The HRSG has been designed to provide 50 tonnes per hour of steam at 45barg which is conveyed to the oil refinery.
- A supplementary fired burner is provided in the first stage of the HRSG tubes. The supplementary fired burner can burn both natural gas and refinery off-gas, supplied from the adjacent oil refinery.
- The plant is designed to run on 0.1% sulphur content distillate, as standby fuel.

- The low pressure steam, expanded across the steam turbine, is condensed in air cooled condensers.
- The plant requires make up water for the HRSG. This is supplied by potable water from the Irish Water water main.

The power generation process can be summarised as follows:

Air for combustion air is drawn through air filters and compressed in the gas turbine compressor section, before going to the combustion chambers. Natural gas, at approximately 38bar, is injected and mixed with the air in the combustion chambers (combustors) where it burns at a very high temperature (>1000°C). The pressurised hot combustion gases expand across the power section of the gas turbine, which produces the motive power required for the air compressor section compressor and an excess of power to drive the electrical generator. The generator produces electricity at 19kV. The exhaust gases from the gas turbine exit at a high temperature of ~ 650°C, and such energy is recovered in the Heat Recovery Steam Generator (HRSG), with the exhaust gas exiting via the main stack (60 metres) at approximately 80°C. High pressure superheated steam at approximately 160 bar is generated in the HRSG. This steam is fed to and expanded across the Steam Turbine to produce motive power to also help drive the electrical generator. The exhaust steam from the Steam Turbine is fed to the Air Cooled Condenser (ACC) which condenses the steam. The condensate is then returned as feed water to the HRSG.

2.4 Inventory of Site Buildings, Plant, Raw Materials and Wastes

2.4.1 Main Buildings

Table 1 Main Buildings on Site

	Main Buildings and Structures	**Permitted Dimensions (m)**		
		W	L	H
1	Main Turbine Building	42.5	108	60
2	Water Treatment Plant Building	20	42.5	7.4
3	Workshop/Stores/Canteen	13.4	51.56	8
4	Gas Compressor Building	20	35	9
5	Gas Compressor Boiler Building	3.7	6	3.15
6	Administration Building	14	22.7	10.6
7	ACC Control Room	25	10.5	5
8	Auxiliary Boiler Building	14	18	15
9	Gate House	5.6	5.6	3.5

2.4.2 Plant and Structures

(1) Gas Turbine

(2) Heat Recovery Steam Generator (HRSG)

(3) Generator

(4) Steam Turbine

(5) Air Cooled Condenser

(6) Main Transformer

(7) Auxiliary Transformer

(8) Electrical Systems and Grid Connection

(9) Auxiliary Boiler

(10) Water Treatment Plant

(11) Process Water System

(12) Surface Water System

(13) Emergency Generator

(14) Fire Fighting Pump House

(15) Fuel Forwarding Skid

(16) Fin Fan Coolers

(17) Fuel Gas Performance Heaters

(18) Raw Water Tanks (1)

(19) Demineralised Water Tank (2)

(20) Distillate Tank (2)

2.4.3 Hazardous Or Potentially Polluting Components Or Construction Materials

PCBs or asbestos are not used or present on site.

2.4.4 Bunds, Secured or Protected areas

The bunds, secured or protected areas are as follows:

- Bunds for caustic tanks
- Bunds for hydrochloric acid tanks
- Bunds for hydrochloric acid scrubber towers
- Bunds in waste water treatment building for treatment chemicals
- Fuel management spool piece bund
- Spool piece foam tank bund
- Bunds for Carbonhydrazide tanks HRSG and auxiliary boiler
- Bunds for Ammonia tanks HRSG and auxiliary boiler
- Bund for distillate tanks
- Distillate foam tank bund
- Bunds for fin fan coolers

- Stack drain tank bund
- Hydraulic power unit bund
- CCCW pump bund
- CCW shot feeder tank bund
- GT drains tank bund
- Lube oil tank bund
- Bunds for various diesel tanks
- Bunds for various skids
- Bunds for main and other transformers
- Chem-stores in chemical compound
- Plastic mobile bunds

2.5 Inventory of Raw Materials, Products and Wastes

2.5.1 Raw Materials

The main input material is natural gas, which is supplied by pipeline and is not stored on site. The materials stored on site are listed in Table 2 below. The amount present on site typically is very close to the maximum storage capacity. The maximum storage quantities are given in Table 2. For the purposes of the DMP, it is assumed that the maximum storage quantity will be present on site.

Table 2 Materials Stored on Site

Material/Substance	Maximum storage capacity
Distillate	2,027 m3
Hydrochloric Acid	6,000 litres
Sodium Hydroxide	6,000 litres
Inergen gas	7,000 litres
Antiscalant typically based on polyacrylic acid derivative	1,290 litres
Ammonia 10-25%	2,470 litres
Hydrogen (Gas Bottles)	8 MCPs
Fresh Water	3,700tonnes
Demineralised Water	9,000 tonnes
Condensate Water	800 tonnes
Hydrogen Balance Air	1 bottle
Methane Balance Air	1 bottle
Anvol PE 46XC	1,040 litres
Betzdearborn DCL30	1,290 litres
Biomate	50 litres
Carbon Dioxide	4 MCPs and 9072 litres in main storage tank
CleanBlade GTC1000	621 kg
FM 200	560 litres
Hypersperse	1,290 litres

Kleen MCT 103	0.12 tonnes
Kleen MCT 511	0.138 tonnes
Natural Gas	
Argon	2 bottles
Nytro Libra	4 transformers (120m^3, 8m^3, 3m^3, 2.3m^3)
Oxygen	2 bottles
Propane	4 bottles
Shell Turbo	62 m^3
CEMS Calibration Gases	8 bottles

2.5.2 Wastes

Table 3 lists the hazardous or non-hazardous wastes and the expected maximum quantities, which are likely to be present on site.

Table 3 Wastes Likely to be Present on Site *(based on October 2020 Waste Register)*

Waste Material	EWC Code	Quantity in storage (Tonnes)
Sulphuric Acid	06 01 01*	0.05
Sodium Hydroxide	06 02 04*	0.02
Mineral-based non-chlorinated engine, gear and lubricating oils	13 02 05*	16.75
Other engine, gear and lubricating oils.	13 08 02*	0.63
Packaging containing residues of or contaminated by dangerous substances	15 01 10*	0.06
Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	15 02 02*	2.38
Discarded equipment other than those mentioned in 16 02 09 to 16 02 13	16 02 14*	0.17
Aqueous liquid wastes containing hazardous substances	16 10 01*	25.86
Aqueous liquid wastes other than those mentioned in 16 10 01.	16 10 02*	8.51
Iron and steel	17 04 05	2.88
Biodegradable kitchen and canteen waste	20 01 08	0.76
Wood other than that mentioned in 20 01 37	20 01 38	2.26
General mixed waste including commercial waste and municipal waste	20 03 01	4.55
Bulky waste	20 03 07	2.58

2.6 Maximum Storage Capacity For Raw Material, Products Wastes And Maximum Storage Amount In Practice

Refer to Table 2 above.

3 Closure Tasks and Programmes

3.1 Introduction

Upon cessation of operations at the WIPP plant and subsequent decommissioning at the facility, it is anticipated that there will be no remaining environmental liabilities, i.e. clean closure is the target.

The first task will be to apply for planning permission to demolish the buildings on site. A planning application will be submitted to Cork County Council.

3.2 Plant or Equipment Decontamination Requirements

All plant and equipment that has had contact with hazardous materials will be decontaminated to remove of the hazardous materials. All decontamination of plant and equipment will be verified either analytically or through a visual inspection, whichever is appropriate.

Certain sections of plant and equipment utilised on the WIPP site, depending on the numbers of years in service and years since installation, may have operational market value. Where possible, BGE/the DMP implementation contractor will attempt to realise maximum sale value from all plant and equipment. However, for the purposes of this report it is assumed that all plant and equipment will realise scrap value, other than those areas of plant and equipment identified throughout the report that have a higher lifecycle potential and may be retained on site.

3.3 Plant and Materials Disposal or Recovery

This DMP assumes that all plant on the WIPP site will realise scrap value only. Depending on when this DMP is activated, some plant may have operational life remaining and be suitable for use in another facility or retained on site in a ready to use state. When assessing plant life, BGE/the DMP implementation contractor will endeavour to utilise the best economic option, having undertaken a risk assessment and cost-benefit-analysis, to ensure at all times that the criteria for Clean Closure, as specified in this DMP, are achieved.

Table 2, in section 2.5.1, is an inventory of the materials expected to be on site. BGE/the DMP implementation contractor will seek to return all process and production materials, utility chemicals, water treatment plant and waste water treatment plant chemicals, warehouse stores and laboratory stores to the suppliers or to sell the materials, whichever is most appropriate, to realise maximum sale value. For the purposes of the DMP value the sale of materials is assumed to be cost neutral.

3.3.1 Gas Turbine

The Gas Turbine (GT) will have come into contact with air and natural gas on its internal surfaces, plus lubricating oil at the bearings, during operations. The main decommissioning concern for the GT is draining and flushing of the lubricating oil system. The entire GT lubricating oil system will be drained and flushed

through to ensure no oil remains in the GT during decommissioning. The GT will be disassembled on site into manageable sections and sold as scrap metal. Lubricating oil and flushing fluid will also be disposed of off-site. The disposal cost of the oil is included in the costs table in Appendix B.

3.3.2 HRSG

The HRSG will have come into contact with water and steam on its internal surfaces and exhaust gas on its external surfaces during operations. When the HRSG has been shut down permanently for decommissioning, the internal water will be drained to the effluent water treatment system for normal discharge off site through SW1, when it has been treated. The HRSG will be disassembled in manageable sections and sold as scrap metal.

3.3.3 Steam Turbine and Generator

The Steam Turbine (ST) will have come into contact with steam on its internal surfaces, plus lubricating oil at its bearings during operations. The main decommissioning concern for the ST is draining and flushing of the lubricating oil system. The entire ST lubricating oil system will be drained and flushed through to ensure no oil remains in the ST during decommissioning. The ST will be disassembled on site into manageable sections and sold as scrap metal. Lubricating oil and flushing fluid will also be disposed off-site. The disposal cost of the oil is included in the costs table in Appendix B.

The Generator will only have used lubricating oil at its bearings during operations. The main decommissioning concern for the Generator is draining and flushing of the lubricating oil system. The entire Generator lubricating oil system will be drained and flushed through to ensure no oil remains in the generator during decommissioning. The Generator will be disassembled on site into manageable sections and sold as scrap metal. Lubricating oil and flushing fluid will also be disposed of off-site. The disposal cost of the oil is included in the costs table in Appendix B.

3.3.4 Air Cooled Condenser

The Air Cooled Condenser (ACC) will have come into contact with steam and water on its internal surfaces and air on its external surfaces during operations. When the ACC has been shut down permanently for decommissioning, the internal water will be drained to the effluent process water treatment system for normal discharge off site through SW1. The ACC will be disassembled in manageable sections and sold as scrap metal.

3.3.5 Air Inlet Filter

The air inlet filter will have come into contact with air (used for combustion). The air filter cartridges will be removed from the filter housing and disposed of off-site. The air filter housing is steel and will be dismantled in manageable sections and sold as scrap metal.

3.3.6 Main Transformer

The main transformer will have come into contact internally with oil during operations. The main decommissioning concern for the main transformer is draining and flushing of the oil system. The oil will be fully drained and disposed of off-site. The disposal cost of the oil is included in the costs table in Appendix B. The oil system will be flushed to ensure no residual oil remains. The transformer will be sold as used equipment or as scrap metal.

3.3.7 Auxiliary transformer

The auxiliary transformer will have come into contact internally with oil during operations. The main decommissioning concern for the auxiliary transformer is draining and flushing of the oil system. The oil will be fully drained and disposed off-site. The disposal cost of the oil is included in the costs table in Appendix B. The oil system will be flushed to ensure no residual oil remains. The transformer will be sold as used equipment or as scrap metal.

3.3.8 3.3.8 Fuel gas Performance Heater

The fuel gas heater will have come into contact with natural gas and steam during operations. The heater system will be isolated and purged of natural gas. The steam side condensate will be drained to the effluent process water treatment system for normal discharge off site through SW1. The heater will be dismantled and sold as scrap metal.

3.3.9 Fin Fan Cooler

The fin fan cooler will have come into contact internally with water and externally with air. There will also be lubricating oil in the fan motors. The water will be drained from the internal sections to the effluent process water treatment system for normal discharge off site through SW1. The oil will be drained from all fans prior to dismantling of the fans. The fin fan cooler, motors and fans will be dismantled and sold as scrap metal.

3.3.10 Sample Analysis Panel

The sample analysis panel is linked to probes located in the main stack. The panel mainly consists of electrical and electronic measuring devices. The panel will be dismantle and sold as scrap metal.

3.3.11 Main Stack

The main and auxiliary stacks will have come into contact with exhaust gas from the gas turbine during operations. The stacks will be cleaned, dismantled and sold as scrap metal. Any residual cleaning materials or wastes disposed of off-site.

3.3.12 Distillate

The distillate system consists of two storage tanks, purification/filtering skid and a fuel forwarding skid (pumping unit). For decommissioning of the plant, the

distillate stocks will be run down to a minimum stock level. In the event that a large volume of distillate remains in the storage tanks, this supply will be sold off site for alternative use or disposed of accordingly. The decommissioning of the distillate system will include emptying and cleaning of the two storage tanks, emptying and flushing of the purification/filtering skid and fuel forwarding skid. This DMP allocates costs for sale of the tank and systems as scrap metal. However, the cleaned tanks, purification/filtering skid and fuel forwarding skid may be retained in situ as usable assets.

3.3.13 Switchyard

The switchyard compound is leased to EirGrid and all equipment within the compound will be owned and maintained by EirGrid. Therefore decommissioning of the switchyard and grid connection is outside the scope of management of BGE/ the DMP implementation contractor and not included in this DMP.

3.3.14 Auxiliary Boiler

The auxiliary boiler will have come into contact with water and steam on its internal surfaces and exhaust gas on its external surfaces during operations. It will also have potentially used distillate in its duel fired burners. When the auxiliary boiler has been shut down permanently for decommissioning, the internal water will be drained to the process water treatment system for normal discharge off site. The distillate fuel supply to the boiler will be emptied, flushed clean and the remaining flushing fluid disposed of off-site. The boiler unit will be disassembled in manageable sections to be sold as scrap metal.

3.3.15 Workshop/Stores/Canteen

All spare parts located in the stores will be returned to the suppliers, sold as scrap metal. The workshop equipment will be sold as used equipment or as scrap metal. The canteen equipment and furniture will be sold or disposed of off-site as scrap metal.

3.3.16 Water Treatment Plant

The water treatment plant will have come into contact with potable water from the Irish Water water main, and various chemicals for water treatment purposes. Any hazardous chemicals will be sold or returned to the supplier or disposed of off-site. The water treatment plant system will be emptied, flushed clean and the remaining flushing fluid drained to the effluent process water treatment system for normal discharge off site through SW1. This DMP allocates costs for the full disposal of the water treatment plant off site. However, the empty and clean water treatment plant maybe mothballed for potential future use together with the 3 water storage tanks.

3.3.17 Boiler Feed Pumps

The boiler feed pumps will have come into contact internally with condensate. There will also be lubricating oil in the main gearbox drive. The pumps will be drained of condensate which will be discharged to SWI following treatment in the

process water treatment system. The gear box drives will be drained of oil, flushed clean and remaining fluids disposed of off-site. The disposal cost of the oil is included in the costs table in Appendix B. The pumps will be sold as used equipment or as scrap metal.

3.3.18 Fire Pump House

The fire pump house contains the main, auxiliary and jockey electrical motor driven pumps. There is also a diesel engine driven pump. The system is primarily filled with water, with distillate and lubricating oil for the diesel engine. The system will be drained of water, with the water disposed in the process water treatment system. The distillate and oil will be drained from the diesel engine. The pumps and engine will be dismantled and be sold as used equipment or as scrap metal.

3.3.19 Process Water treatment System

The process water treatment system will have mainly come into contact with blow down water from the HRSG and auxiliary boiler, plus waste water from the water treatment plant. The process water treatment system will be emptied, flushed cleaned and the remaining flushing fluid disposed of off-site through SW1. This DMP allocated costs for the full disposal off site of the process water treatment system. This would involve treatment chemicals being sold and pumps, etc. being sold as used equipment or as scrap metal. However, the cleaned effluent tank maybe covered to prevent ingress of rain water and the system mothballed for potential future use with the water treatment system and water storage tanks.

3.3.20 Emergency Generator

The Emergency Generator will have come into contact with lube oil and distillate fuel oil on its internal surfaces and exhaust gas on its external surfaces during operations. When the emergency generator has been shut down permanently for decommissioning, the internals of the engine will be drained, flushed clean and the remaining flushing fluid disposed off-site. The disposal cost of the fluids is included in the costs table in Appendix B. The generator unit will be sold as used equipment or disassembled in manageable sections for disposal off site.

3.3.21 Water storage Tanks

The water storage tanks (3) will have come into contact with raw and demineralised water and also condensate. This DMP allocates costs for the full disposal of water tanks off site. This would involve the tanks being sold as used equipment or as scrap metal. However, the cleaned water tanks maybe mothballed for potential future use.

3.3.22 Electrical Building

The electrical building contains electrical and electronic equipment to power and control plant utilities, offices and office equipment, computer and control systems, fire detection and extinguishing systems, etc. When the decommissioning works are complete to the extent that all electrical power supplied from the electrical

building can be discontinued permanently, the building will be shut down and dismantled, with all equipment being sold or disposed of off-site in line with the WEEE Directive.

3.3.23 Ancillary Plant and Equipment

Sewage Treatment Plant

The sewage treatment plant will be maintained in operation until such time as all onsite decommissioning activities are complete and there no longer exists a need for such a system. The sewage treatment plant will have come into contact with grey water and untreated sewage from the plant. The system will be emptied, flushed clean and the remaining flushing fluid disposed of off-site. The sewage treatment system is skid mounted and will be sold as used equipment or as scrap metal.

Small Storage Tanks

The smaller tanks not mentioned above will be cleaned and any residual material will be sold as used equipment or as scrap metal. The tanks will be disposed of off-site.

Natural Gas

Gas Networks Ireland own and operate the gas pipeline and Above Ground Installation (AGI) on site. In the event of decommissioning of the WIPP site, the gas supply to the site would be shut off by Gas Networks Ireland and the AGI made free of gas and made safe. These items of plant and equipment are viewed as third party assets.

Electrical Systems and Transformers

Medium and low voltage electrical switch gear will be decommissioned and sold as used equipment or as scrap metal. Transformers will be decommissioned and drained of insulating oil which will be disposed off site. The disposal cost of the oil is included in the costs table in Appendix B.

Surface Water Drainage System

The surface water drainage system will be maintained in operation after decommissioning. This system will continue to collect surface water from the site in the attenuation pit, where the water will discharge to the Glanagow Stream via an oily water separator and silt traps.

Chemical Injection Systems/Skids

Chemical injection systems and skids will be cleaned and any residual material will be sold or disposed of, off site. The skids will then be sold as used equipment or as scrap metal.

Pumps

All pumps will be isolated, cleaned, flushed where required, and any remaining flushing fluid disposed of off-site. The pumps will be sold as used equipment or as scrap metal.

Air Filters

The air filters will be removed from the filter housing and disposed of off-site. The filter housings will be sold as used equipment or as scrap metal.

Compressed Air Plant

The compressed air plant will have come into contact with air and lubricating oil during operations. The lubricating oil system will be emptied, flushed clean and any remaining flushing fluid disposed of off-site. The air compressors and associated equipment will be sold as used equipment or as scrap metal.

Gas Storage

All gas cylinders will be returned to the suppliers. The gas storage area will be cleaned and any residual material will be disposed of in accordance with the IE licence.

Decommissioning of Sumps and Underground Pipes

All sumps will be emptied, cleaned and rendered safe. All sumps will be dismantled or broken up, backfilled where required and rendered safe. The underground piping consists of water drainage system piping, firefighting system piping and potable water system piping. All underground pipes will be flushed clean and made safe.

Laboratory Areas

The laboratory shall be maintained in operation until all other decommissioning activities have been completed. Then the following activities will be undertaken:

- Sale, return to supplier or disposal of all laboratory chemicals.
- Sale or disposal of all chemical containers.
- Cleaning and decontamination, sale or disposal of laboratory instruments and equipment.

Offices, Administration, Reception

The DMP for the administration building will involve the removal of administration equipment and furniture for sale or disposal off site.

Buildings

The DMP for the buildings will consist of the following actions:

- Sale or disposal of all unused materials off site.
- Sale or disposal of all opened containers off site.
- Cleaning and decontamination of the storage areas.

Following decommissioning of the facilities, all buildings, other than those previously mentioned that may be retained, will be demolished and removed off site for disposal.

3.4 Waste Disposal or Recovery

All wastes, both non-hazardous and hazardous, will be removed off site for recycling, recovery, treatment or disposal, as the case may be in compliance with the IE licence conditions. The maximum quantities of hazardous and non-hazardous wastes expected to be onsite, arising from normal operations, are listed in section 2.5.2 above. The maximum quantities of hazardous and non-hazardous wastes arising from the decommissioning activities are:

Table 4 Maximum quantities of waste arising from the decommissioning activities Waste material	**EWC Code**	**Quantity (Tonnes)**
Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06	17 01 07	5,500
Wood, glass, plastic (excluding 17 02 04*)	17 02 01, 17 02 02, 17 02 03	300
Sludges from on-site effluent treatment other than those mentioned in 10 01 20 (includes transport)	10 01 21	3
Sludges from on-site effluent treatment containing dangerous substances (includes transport)	10 01 20*	1
Aqueous sludges from boiler cleansing containing dangerous substances (includes transport)	10 01 22*	0.5
Aqueous sludges from boiler cleansing other than those mentioned in 10 01 20 (includes transport)	10 01 23	0.5
Other hydraulic oils (including transport)	13 01 13	1
Mineral based non-chlorinated insulating and heat transmission oils	13 03 07*	105
Other engine, gear and lubricating oils	13 02 08	0.6

3.5 Decommissioning Programme

A programme for implementation the decommissioning plan is provided in Appendix A. The programme allows for preparing a planning application and obtaining planning permission, procuring a decommissioning contractor, all of the decommissioning tasks, on-going monitoring during the decommissioning phase on site, undertaking validation testing and the preparation of a validation report, and submission of the validation report to the Agency.

3.6 Ongoing Tasks Following Decommissioning

When the WIPP plant has been successfully decommissioned, there will be minimal, if any, ongoing aftercare tasks. A financial provision will be allowed for routine inspections of the site and general landscaping/caretaking. A security company will be employed to make frequent visits to the site until it is sold.

3.7 Soil or Spoil Recovery

The facility has no requirement under the IE licence to conduct regular soil monitoring. Currently there is no contaminated soil on site. If contaminated soil is uncovered as part of the DMP, it will be managed in accordance with Condition 10.1 of the IE licence.

4 Criteria for Successful Closure

The goal of the DMP is clean closure. An environmental due diligence audit will be undertaken, following decommissioning of the facility, to determine if clean closure has been achieved and that all environmental liabilities have been removed from site. The environmental due diligence audit will demonstrate that the following criteria have been met:

- Compliance with the IE licence requirements.
- All plant and equipment safely decommissioned and decontaminated using standard procedures and appropriately licensed contractors.
- All disposals of wastes, materials and substances complied with regulatory requirements.
- All records relating to decommissioning, decontamination and the disposal of wastes, materials and substances retained throughout the closure process and made available for inspection thereafter for 7 years.
- No soil or groundwater contamination at the site, verified using monitoring data and a soil/groundwater assessment at the time of closure (if required).
- Hazards and environmental risks addressed and the Agency satisfied that the site has been returned to a satisfactory state.
- The Environmental Management System in place and actively implemented during the closure period.
- Sufficient funds in place to cover the full costs.
- The asset is suitable for use as an industrial development site, as demonstrated by the environmental due diligence audit.

5 Closure Plan Validation

5.1 Independent Audit

Prior to the execution of the DMP, BGE/the DMP implementation contractor will engage the services of a suitably qualified and experienced independent environmental consultant. This consultant will be retained to monitor the full execution of the DMP and report on compliance both to BGE/the DMP implementation contractor and the Agency.

In particular, the consultant will report on the following areas:

- Physical verification of removal of all hazardous materials and fluids from site.
- Physical verification that all fluids systems have been emptied, flushed clean and isolated or removed in compliance with the DMP.
- Verification that the facility poses no risk to the environment through contamination of surface water, groundwater, soil or air.
- Issue the Agency with a final report on the execution of the DMP.

5.2 Final Report

In compliance with Condition 10.4 of the IE licence, BGE/ the DMP implementation contractor will issue to the Agency a Final Validation Report, which will include a certificate of the implementation of the DMP.

5.3 Licence Surrender

On completion of the implementation of the DMP, BGE will apply for a surrender of the licence.

6 Closure Plan Costing

Refer to Appendix B for the detailed closure plan costings and notes on the basis of the costings.

6.1 Planning Application to Cork County Council

A planning application will be made to Cork County Council. The planning application fee, newspaper notice cost and costs and expenses for preparing the application will be €5,145 excluding VAT.

6.2 Plant and Equipment Decontamination Costs

The total cost of the plant and equipment decontamination phase of the plant closure is estimated at €162,274 excluding VAT. This includes all of the contractor's overheads, facilities, utilities and consumables costs as well as labour costs.

6.3 Plant and Equipment Decommissioning Costs

The total cost of the plant and equipment decommissioning phase of the plant closure is estimated at €302,660 excluding VAT. The unit rate of €2,522 per day for 120 days includes all of the contractor's overheads, facilities, utilities and consumables costs as well as labour costs.

6.4 Demolition Costs

The total cost of the demolition phase of the plant closure is estimated at €219,319 excluding VAT. The costs assumed that all steelwork in buildings will be disassembled and sold as scrap metal. The concrete and concrete block walls, beams and columns and the internal partitions, ceilings, doors, fittings and fixtures etc. will be demolished and the waste removed from site. The unit rate of €2,193 per day for 100 days includes all of the contractor's overheads, facilities, utilities and consumables costs as well as labour costs.

6.5 Waste Recovery or Disposal Costs

The total waste recovery or disposal cost associated with the plant closure is estimated at €1,005,072 excluding VAT. The cost includes the disposal of the routine wastes, which would be expected to be on site, as listed in Table 2, as well as the wastes arising for the decontamination, decommissioning and demolition of the plant. The tonnage of construction and demolition waste arising from the demolition of the buildings was calculated. The costs are included in Appendix B.

6.6 Environmental Monitoring Costs

On-going environmental monitoring of the site, following the successful decommissioning of the plant will not be required because all materials and plant, which could pose a risk to the environment, will have been removed during the decommissioning phase. BGE has allowed for monthly groundwater and surface water monitoring during the decommissioning works. The cost of this environmental monitoring has been estimated at €39,447 for one year, excluding VAT. This cost is included in Appendix B.

6.7 Site Security Costs

Site security following plant closure and prior to the commencement of the decommissioning works is estimated at €39,477.

Site security during decommissioning will form part of the plant decontamination, decommissioning and demolition costs and the associated costs are included in these.

Following implementation of the DMP, a security contractor will be employed to undertake routine monitoring visits of the site. The anticipated costs for this are €26,318 per annum, excluding VAT.

6.8 Validation Costs

The estimated cost of carrying out the validation audit and preparation of validation report is €17,546 excluding VAT. This cost is included in Appendix B.

6.9 Management and Utility Costs

The overall management and utility costs associated with the decommissioning project are estimated at €324,057 excluding VAT. This cost is included in Appendix B.

7 Closure Plan Review and Update

7.1 Proposed Frequency of Review

In compliance with Condition 10.2.2 of the IE licence, the DMP will be reviewed annually, and any proposed changes will be submitted to the Agency for approval as part of the facility's Annual Environmental Report (AER).

7.2 Proposed Scope of Review

The scope of the annual review of the DMP will cover the following at a minimum:

- Review of compliance with the facility's IE Licence conditions, plus all statutory and regulatory licensing and permitting obligations.
- Review all potential risk areas that may result in surface water, groundwater, soil or air contamination and identify changes that may be require in the DMP.
- Initiate and review all change-order processes relating to the DMP.
- Review of costs associated with changes to the DMP.
- Review all costs associated with the DMP to reflect up to date market conditions.

8 Financial Provision

As outlined in the introduction section, Centrica has put in place a Parental Company Guarantee to cover this liability.

Appendix A

Programme for Implementation of DMP

A1 Programme for Implementation of DMP

ID	Stage	m1	m2	m3	m4	m5	m6	m7	m8	m9	m10	m11	m12	m13	m14	m15	M16	On-going
1	Prepare planning application, apply for permission																	
2	Appoint DMP implementation contractor																	
3	Tender and procure decommissioning contractor																	
4	Remove materials and wastes from site																	
5	Set up segregated C&D/decommissioning waste storage areas																	
6	Plant and equipment decontamination																	
7	Decommission non-essential services																	
8	Decommission and dismantle equipment																	
9	Demolish buildings, bunds, plinths etc.																	
	Remove decommissioning wastes																	
10	Monitoring during decommissioning phase																	
11	Validation testing and preparation of validation report																	
12	Submit validation report to EPA																	
13	Site security																	

Appendix B

Site Decommissioning Costs

B1 Site Decommissioning Costs

Please see site decommissioning costs overleaf.

Task	Description	EWC Code	Quantity	Measurement Unit	Unit Rate €, 2015		Cost €, 2015	Cost €, 2016	Cost €, 2017	Cost €, 2018	Cost €, 2019 and 2020	Cost €, 2021	Source of Unit Rates
Planning application	**costs for prepare planning application[A]**						0.00	4,784.85	4,827.15	4,865.46	4,899.52	5,144.49	
Plant and equipment decontamination i.e. cleaning and removal of chemicals (and return to suppliers) and other residues (excluding off site waste recovery or disposal costs dealt with below)	Contractor Supervision costs		40	per day	see footnote 1	0	0.00	20,580.00	20,682.90	20,744.64	20,866.84	21,910.18	Contractor rates
	Decontamination of all equipment and plant		40	per day	see footnote 2	0	0.00	131,712.00	132,370.56	132,765.70	133,679.72	140,363.71	Contractor rates
Plant and equipment decommissioning i.e. removal from service and dismantling of plant and equipment	Contractor Supervision costs		120	per day	see footnote 1	0	0.00	61,740.00	62,048.70	62,233.92	62,662.70	65,795.84	Contractor rates
	Decommissioning of all plant and equipment		120	per day	see footnote 3	0	0.00	222,264.00	223,375.32	224,042.11	225,585.71	236,865.00	Arup In-house experience
	Plant and equipment recovery or disposal [4]						0.00	0.00	0.00	0.00	0.00	0.00	
Demolition	Contractor Supervision costs		100	per day	see footnote 1	0	0.00	51,450.00	51,707.25	51,861.60	52,218.91	54,829.86	Contractor rates
	Any demolition works required to be carried out in order to remove any risk of environmental pollution and/or return the site to a satisfactory state		100	per day	see footnote 5	0	0.00	154,350.00	155,121.75	155,584.80	156,656.74	164,489.58	Arup In-house experience
Waste disposal/recovery	Sludges from on-site effluent treatment other than those mentioned in 10 01 20 (includes transport)	10 01 21	3	tonnes		0	0.00	463.05	465.37	466.75	469.97	493.47	Contractor rates
	Sludges from on-site effluent treatment containing dangerous substances (includes transport)	10 01 20*	1	tonnes		0	0.00	308.70	310.24	311.17	313.31	328.98	Contractor rates
	Aqueous sludges from boiler cleansing containing dangerous substances (includes transport)	10 01 22*	0.5	tonnes		0	0.00	154.35	155.12	155.58	156.65	164.48	Contractor rates
	Aqueous sludges from boiler cleansing other than those mentioned in 10 01 20 (includes transport)	10 01 23	0.5	tonnes		0	0.00	77.18	77.56	77.79	78.33	82.25	Contractor rates
	Mixed municipal waste (includes transport and landfill levy)	20 03 01	4	tonnes		0	0.00	720.30	723.90	726.06	731.06	767.61	Contractor rates
	Biodegradable kitchen and canteen waste (includes transport and landfill levy)	20 01 08	1	tonnes		0	0.00	180.08	180.98	181.52	182.77	191.91	Contractor rates
	Mixed packaging (includes transport and landfill levy)	15 01 06	1.5	tonnes		0	0.00	270.11	271.46	272.27	274.15	287.86	Contractor rates
	Packaging containing residues of or contaminated by dangerous substances (includes transport and landfill levy)	15 01 10*	0.3	tonnes		0	0.00	84.89	85.32	85.57	86.16	90.47	Contractor rates
	Wood other than that mentioned in 20 01 37 (includes transport and landfill levy)	20 01 38	4	tonnes		0	0.00	720.30	723.90	726.06	731.06	767.61	Contractor rates
	Metal (includes transport)	20 01 40	4	tonnes		0	0.00	411.60	413.66	414.89	417.75	438.64	Contractor rates
	Other hydraulic oils (including transport)	13 01 13	1.2	tonnes		0	0.00	222.26	223.38	224.04	225.58	236.86	Contractor rates
	Mineral-based non-chlorinated insulating and heat transmission oils	13 03 07*	105	tonnes		0	0.00	27,011.25	27,146.31	27,227.34	27,414.93	28,785.68	Contractor rates
	Other organic solvents, washing liquids and mother liquors (including transport)	07 01 04	3	tonnes		0	0.00	555.66	558.44	560.11	563.11	591.27	Contractor rates
	Other engine, gear and lubricating oils (including transport)	13 02 08	1.6	tonnes		0	0.00	296.35	297.83	298.72	300.78	315.82	Contractor rates
	Fuel oil and diesel (including transport)	13 07 01	3	tonnes		0	0.00	555.66	558.44	560.11	563.11	591.27	Contractor rates
	Other emulsions (including transport)	13 08 02	0.5	tonnes		0	0.00	92.61	93.07	93.35	93.99	98.69	Contractor rates
	Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances (includes transport and landfill levy)	15 02 02	0.5	tonnes		0	0.00	141.49	142.19	142.62	143.60	150.78	Contractor rates
	Other wastes (including mixtures of materials) from mechanical treatment of waste containing dangerous substances (includes transport and landfill levy)	19 12 11*	0.2	tonnes		0	0.00	56.60	56.88	57.05	57.44	60.31	Contractor rates
	Aqueous rinsing liquids containing dangerous substances (including transport)	11 01 11*	0.1	tonnes		0	0.00	20.58	20.68	20.74	20.88	21.92	Contractor rates
	Other fuels (including mixtures)	13 07 03	0.1	tonnes		0	0.00	18.52	18.61	18.67	18.80	19.74	Contractor rates
	Solid combustible wastes containing dangerous substances (including transport)	19 02 09*	0.2	tonnes		0	0.00	41.16	41.37	41.49	41.78	43.87	Contractor rates

	Paints, inks, adhesives and resins containing dangerous substances (including transport)	20 01 27*	0.1	tonnes		0	0.00	20.58	20.68	20.74	20.88	21.92	Contractor rates
	Laboratory chemicals, consisting of or containing dangerous substances, including mixtures of lab chemicals (including transport)	16 05 06*	0.1	tonnes		0	0.00	20.58	20.68	20.74	20.88	21.92	Contractor rates
	Spent catalysts containing dangerous transition metals (17) or dangerous transition metal compounds (including transport)	16 08 02*	0.3	tonnes		0	0.00	61.74	62.05	62.23	62.66	65.79	Contractor rates
	Waste paint and varnish containing organic solvents or other dangerous substances (including transport)	08 01 11	0.2	tonnes		0	0.00	41.16	41.37	41.49	41.78	43.87	Contractor rates
	Waste adhesives and sealants containing organic solvents or other dangerous substances (including transport)	08 04 09*	0.1	tonnes		0	0.00	20.58	20.68	20.74	20.88	21.92	Contractor rates
	Alkaline batteries (except 16 06 03) (including transport)	16 06 04	0.1	tonnes		0	0.00	10.29	10.34	10.37	10.44	10.96	Contractor rates
	Discarded equipment other than those mentioned in 16 02 09 to 16 02 13 (including transport)	16 02 14	0.1	tonnes		0	0.00	10.29	10.34	10.37	10.44	10.96	Contractor rates
	wastes from cooling-water treatment	10 01 26	25	tonnes		0	0.00	3,858.75	3,878.04	3,889.62	3,916.42	4,112.24	
	solutions and sludges from regeneration of ion exchangers	19 09 06	20	tonnes		0	0.00	3,087.00	3,102.44	3,111.70	3,133.13	3,289.79	
	discarded inorganic chemicals consisting of or containing dangerous substances	16 05 07*	0.05	tonnes		0	0.00	10.29	10.34	10.37	10.44	10.96	
	discarded organic chemicals consisting of or containing dangerous substances	16 05 08*	0.05	tonnes		0	0.00	10.29	10.34	10.37	10.44	10.96	
	other solvents and solvent mixtures	14 06 03*	3	tonnes		0	0.00	617.40	620.49	622.34	626.63	657.96	
	Wood, glass, plastic (excluding 17 02 04*)	17 02 01, 17 02 02, 17 02 03	300	tonnes		0	0.00	54,022.50	54,292.61	54,454.68	54,829.86	57,571.35	
	C&D waste (includes transport and landfill levy)	17 01 07	5500	tonnes		0	0.00	848,925.00	853,169.63	855,716.40	861,612.08	904,692.68	Contractor rates
Environmental Monitoring	Not required post-site restoration						0.00	0.00	0.00	0.00	0.00	0.00	
	Groundwater & surfacewater monitoring during decommissioning (includes lab costs)		12	Per monitoring round		0	0.00	37,044.00	37,229.22	37,340.35	37,597.62	39,477.50	Contractor rates
Site security	Gates, fencing, etc (existing palisade fencing and security gates will be kept in place)						0.00	0.00	0.00	0.00	0.00	0.00	
	CCTV (not required)						0.00	0.00	0.00	0.00	0.00	0.00	
	Security Personnel Costs (based on once per day patrol visits)		12	per month		0	0.00	24,696.00	24,819.48	24,893.57	25,065.07	26,318.32	Contractor rates
	Security prior to decommissioning works (based on twice per day patrol visits) (assume 36 weeks)[7]		36	per week		0	0.00	37,044.00	37,229.22	37,340.35	37,597.62	39,477.50	Contractor rates
Validation audit	Consultant costs		20	per day	see foot note 1	0	0.00	16,464.00	16,546.32	16,595.71	16,710.65	17,546.18	Arup In-house experience
Management and utility costs	Management prior to decommissioning works (assume 36 weeks)[7]		160	per day		0	0.00	52,684.80	52,948.22	53,106.28	53,472.16	56,145.77	Arup In-house experience
	Utilities prior to decommissioning works (assume 36 weeks)[8]		36	per week		0	0.00	1,037.23	1,042.42	1,045.53	1,052.72	1,105.36	Current Whitegate power station standing charge rate
	Management (incl H&S) (assume 18 weeks over duration of decommissioning works)		90	per day		0	0.00	74,088.00	74,458.44	74,680.70	75,195.23	78,954.99	Arup In-house experience
	General administration (assume 16 weeks)		80	per day		0	0.00	26,342.40	26,474.11	26,553.14	26,736.07	28,072.87	Arup In-house experience
	Insurance (post closure)		1	unit		0.00	0.00	51,450.00	51,707.25	51,861.60	52,218.91	54,829.86	
	Capital works management including design, tendering, contract administration and site monitoring [6]					0	0.00	98,784.00	99,267.29	99,267.29	99,951.22	104,948.78	Arup In-house experience

	Overheads (during decommissioning is included in contractors costs; post closure will be nil)					0	0.00	0.00	0.00	0.00	0.00	0.00	
Total Excluding VAT (€)						0	0.00	2,009,634.43	2,019,690.35	2,025,446.85	2,039,379.58	2,141,348.56	
Plus contigency at 20% (€)						0	0.00	401,926.89	403,893.26	405,089.37	407,875.92	428,269.71	
Overall Total Excluding VAT (€)							0.00	2,411,561.31	2,423,583.61	2,430,536.22	2,447,255.49	2,569,618.27	

[1] Supervisor rate per day, rate includes overheads and utilities, etc

[2] Based on hire of vacuum tanker and crew of 3 operatives x 2, rate includes overheads and utilities, etc

[3] Based on hire of decommissioning plant and crew of 1 supervisor and 3 operatives, rate includes overheads and utilities, etc

[4] For the purposes of this report, an assumption has been made that recovery/disposal of plant and equipment is cost neutral, given the potential value of scrap metal and steel. This is based on the decomissioning of a large facility in 2013, where there was a postitive scrap value

[5] Based on hire of demolition plant and crew, rate includes overheads and utilities, etc

[6] Breakdown of capital works management as follows:

[7] The 36 weeks accounts for the time to obtain planning permissions and tender and procure the decommissioning contractor

[8] Only utilities standing charges apply as no power will be consumed post closure

	days	**€ per day**	**€ Total**
Capital works management including:			
Design (assume 4 weeks)	20	640	0.00
Tendering (include prep of documents, admin & tender assessment)(assume 4 weeks)	20	640	0.00
Contract administration (assume 8 weeks)	40	800	0.00
Site supervision (assume half time - 12 weeks over decommissioning duration)	60	640	38,400.00
			38,400.00

[A] Planning application costs:

expenses including newspaper notice	550
planning fee 1ha x class 13 fee = €10 /0.1ha	100
consultants fee: 5 days@ 800 per day	4000