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SSE Generation Ireland Limited

Campile, New Ross, Co. Wexford

Closure, Restoration & Aftercare Management Plan 2020

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1.0 Summary

1.1 Introduction

AXIS environmental services were commissioned to carry out a review of the Closure, Restoration and Aftercare Management Plan (CRAMP) for

Name: SSE Generation Ireland Ltd.
Address: Great Island Generating Station, Campile, New Ross, Co. Wexford
Licence/ Permit Number: P0606-03
Activities Licenced: The operation of combustion installations with a rated thermal input equal to or greater than 50MW

to comply with Condition 10 of Industrial Emissions (IE) Licence.

The last CRAMP for the site was completed in 2016 by CMSE consultancy. This report represents the first full external review of the CRAMP by an independent consultant since the initial approved report in 2016.

A review of the CRAMP is required annually in accordance with condition 10 of Industrial Emissions Licence No. P0606-03 in order to take account of any significant changes on site and also to reflect changes to legislation, guidance and inflation. The latter has been completed internally since 2016.

The following EPA Guidance were used as the primary guidance documents in conducting this review;

- EPA Approach to Environmental Liabilities and Financial Provision (2019);
- Guidance on the Financial Provisions for Environmental Liabilities (2015) ;
- Guidance on assessing and costing environmental liabilities - Unit cost rates for verification (2014);
- Guidance on assessing and costing environmental liabilities (2014).

The nature of activities, layout of the plant, systems, raw materials and type of risks have not changed with any degree of significance since the previous CRAMP was carried out. Therefore, the same risk rating and approach was applied to the development of this report.

1.2 Scope of Closure, Restoration and Aftercare Management Plan (CRAMP)

The IE licence P0606-03 outlines in Condition 10 that a Closure, Restoration and Aftercare Management Plan (CRAMP) for the site must be carried out. The text of the licence reads as follows:

- 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, subsoil, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.
- 10.2 Closure, Restoration and Aftercare Management Plan (CRAMP)
- 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. This plan shall be submitted to the Agency for agreement within twelve months of date of grant of this licence. The licensee shall prepare a revised decommissioning management plan for the Heavy Fuel Oil plant. The plan shall be submitted to the Agency for agreement prior to the cessation of the HFO plant.
- 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 Liability Risk Assessment, Decommissioning 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 that 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 requirement for such a report is to ensure the facility has implemented satisfactory measures to protect the environment and is financially aware and prepared to make secure financial provisions to cover the cost of closure of the activity.

A desktop study of available information for the site was reviewed including:

- IE licence application;
- IE licence;
- Environmental Impact Assessment;
- Communications between the EPA and SSE Generation Ltd;
- Previous CRAMP & reviews;
- EMS Procedures;
- Annual Environmental Reports;
- Incidents and complaints files;
- Bund & Tank registers.

A site visit to SSE Generation Ltd. was undertaken by Mark Mc Garry. This involved a comprehensive walkthrough of all process, operations, storage areas and treatment capabilities on site as well as a detailed review of developments and changes to operations on the site with management on-site.

1.3 Disclaimer

This report is based on information supplied by SSE Generation Ltd. to AXIS environmental services and the Environmental Protection Agency (EPA) in their Environmental Reports. The report is based on current uses of the site. The assessment does not deal with any future projects that may occur on site after the date of completion of this report.

1.4 Comparison with Previous Residual Management Plans

Year	Plausible Worst-Case Scenario	Financial Provision	Expiry date of Financial Provision	Comment
2013	€1,301,250	-	-	-
2016	€2,814,026	Agreed & approved with the EPA	-	-
2020	€3,054,877	To be agreed & approved with the EPA	1 year from approval	Includes 10% contingency & accounts for Wholesale Price Index (WPI)

2.0 Site Evaluation

The SSE Generation Ltd., Great Island (SSE, Great Island) combined cycle gas turbine (CCGT) plant which was commissioned in 2014 is located on the shores of Waterford Harbour at the meeting point of the Rivers Suir and Barrow at Great Island, Co. Wexford.

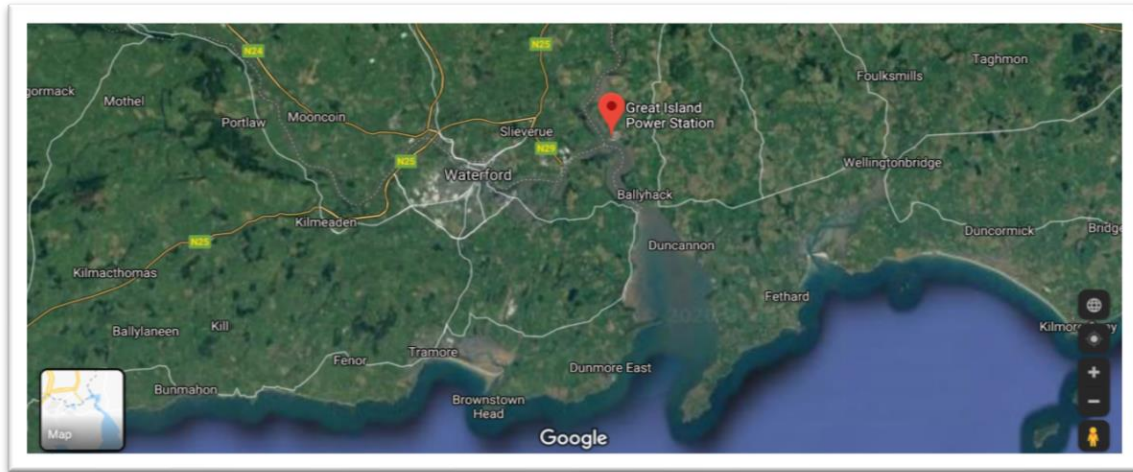


Fig. 2.1 Location map of SSE Generation Ltd., Great Island (Google, 2020)

The Great Island site commenced energy production operations in 1967. The station was originally constructed on lands that were formerly in agricultural use and some lands were reclaimed from the estuary during development of the site. The total area of the site is approximately 143 acres.

In 2009, Endesa Ireland Ltd. acquired the Great Island facility from Electricity Supply Board (ESB). SSE Generation Ltd. subsequently acquired Endesa Ireland Ltd. in 2012 thereby taking ownership of the Great Island site. The construction of the 460 MW CCGT was completed by SSE in 2014 and vastly improved the previous infrastructure of two 6MW and 120MW oil fired turbines on-site while significantly reducing carbon emissions from the site.

The CCGT power plant is based on the premise of optimising energy efficiency. The latter is achieved at the Great Island plant by the burning of natural gas supplied by the Gas Networks Ireland in the Gas Turbine on-site. Electricity is generated primarily from the burning of the gas however the waste heat from the burning process is used to make super-heated steam via a heat recovery steam generator (HRSG) which further creates electricity by driving a steam turbine. The steam is then condensed back to water where it is recirculated back to the HRSG for reuse. This condenser is cooled by the once through cooling water system. Waste gas is emitted through a licenced stack emission point referenced A2-1 where it is monitored primarily for combustion parameters and dust. Emission limit values are subject to change depending on whether the plant is running on natural gas or oil. The Electricity generated from the site is exported to the grid via the switchyard on-site.

There were historical waste disposal activities carried out at the site by previous operators. There are two areas on the site which were used between the 1960's and mid 90's for deposition of excess rock fill, building materials and spoil. Certain parts of a northern segment of Cell 1 was used for deposition of general waste

during the operation of the generation station. The CCGT does not impact on these areas in any way, however by IE Licence is required to monitor groundwater quality in the vicinity of these cells.

The site can operate 24 hours a day, 7 days a weeks and employees 48 full time personnel. The plant operated for 6236 hours in 2019.

The main processes undertaken on site remain the same since the last ELRA issued in 2016.

The facility, comprises of the following infrastructure;

- Security Building;
- Office buildings & canteen;
- Control room;
- Gas storage;
- Above Ground Gas Installation (including gas compressor, gas metering, pressure reducing, heating and filtering skids);
- Gas Turbine and Steam Turbine Building;
- Heat Recovery Steam Generator (HRSG) Building;
- Incoming Water Storage Tanks;
- Water & wastewater Treatment systems;
- Cooling water system;
- Bulk chemical storage (Sulphuric Acid and Sodium Hydroxide);
- Jetty including marine oil offload station;
- Oil Storage;
- Workshops;
- Water treatment systems.

A graphic of the site layout and licenced emission points can be found in Appendix A.

2.1 Emissions

The site has been licenced (P0606) by the EPA under Class 2.1 Energy, since 22/01/2003. The licence has undergone a full review twice, with the current version of the licence being P0606-03. There have been 3 x Technical amendments since the inception of this licence on 16/03/2011, they are summarised below;

Final Licence Determination	Issued 16/03/2011
Technical Amendment A	Issued 04/09/2012 amended section Schedule B.2 of the licence for Emission Point SW13 & associated ELV's and schedule C.5 on Groundwater Monitoring Requirements.
Technical Amendment B	Issued 24/02/2014 amended Schedule B.2 of the original licence to include emission points SW-2 & SW-3a and Schedule C.2.3 for points SW1, SW3b, SW4 & SW12 and associated ELV's

Technical Amendment C Issued 31/12/2015 amended Schedule B.1 of the licence to add emission point A2-1 and associated ELV's

A graphic of the site layout and licenced emission points can be found in Appendix A.

2.2 Licenced Emission Points

2.2.1 Emissions to Air

There is 1 main stack emission on-site, A2-1 which discharges at a height of 60m above ground level and is monitored using a continuous emissions monitoring system (CEMS). A2-1 is associated with the Heat Recovery Steam Generator (HRSG) and is licenced for under Technical Amendment C, Schedule B.1 for both gas and gas oil use. Emission Limit Values (ELV's) for A2-1, include continuous monitoring of flow, pressure, temperature, oxygen, water vapour, nitrogen oxides and carbon monoxide with biannual monitoring of particulates and sulphur dioxide.

2.2.2 Emissions to Surface Water

Surface water from the facility's roofs and hardstand areas drain directly to underground surface water drains which discharge via an oil interceptor to the estuary.

Surface water is monitored primarily in line with licence Technical Amendments A & B of the Licence, as well as schedule C of the main licence. Daily checks include Visual inspection, Total petroleum hydrocarbon (TPH) and pH with monthly checks on suspended solids on SW1, SW3b, SW4 & SW12. Additional monitoring is required for monitoring points namely SW-2, SW3a and SW-13.

2.2.3 Process Water

There are no process effluent emissions to sewer.

2.2.4 Groundwater

There are 13 licenced groundwater monitoring points on-site. There are no unlicensed emissions to ground at the installation. There was however, historical waste disposal activities carried out at the site from previous operators. There are two areas at the installation which were used between the 1960's and mid 90's for deposition of excess rock fill, building materials and spoil. Certain parts of a northern segment of Cell 1 was used for deposition of general waste during the operation of the generation station. The CCGT does not impact on these areas in any way, however in line with Industrial Emissions (IE) Licence conditions there is a requirement to monitor groundwater quality in the area.

The Industrial Emissions Licence requires that these ten listed wells are monitored as follows:

Table 2.2-1: EPA Licence Requirements (Condition C.5)

Location: BH2, BH13, MW101, MW102, MW103, MW106, MW107, MW200, MW202

Parameter	Monitoring Frequency	Analysis Method / Techniques
pH	Annually	Standard Method
Coliforms	Annually	Standard Method
Vanadium	Annually	Standard Method
Ammonia ^{Note 1}	Annually	Standard Method
Mineral Oil	Annually	Standard Method
Arsenic	Annually	Standard Method
Total Petroleum Hydrocarbons	Annually	Standard Method
Aluminium	Annually	Standard Method
Polyromantic hydrocarbons	Annually	Standard Method

Note 1: Only relates to BH2, BH3, MW106, MW20, MW202

Location: BH5, BH7, BH19, BH10

Parameter	Monitoring Frequency	Analysis Method / Techniques
pH	Biennially	Standard Method
Ammonia	Biennially	Standard Method
Vanadium	Annually	Standard Method
Lead	Biennially	Standard Method
Chromium	Biennially	Standard Method
Total Petroleum Hydrocarbons	Biennially	Standard Method
Polyromantic hydrocarbons	Biennially	Standard Method

A recent groundwater assessment report for the monitoring period 2009-2019, completed in September 2019, concluded that:

- SSE would be required to maintain its testing schedule in line with the specifications of its Industrial Emissions Licence;
- The frequency and extent of sampling is sufficient to meet the requirements of this licence;
- There are areas of contamination determined from the groundwater wells, most likely due to historical practices and waste deposition in close proximity to these sample wells;
- The site does not require remediation currently as the concentrations detected in the wells do not make this site unsuitable for industrial purposes. Should the future requirements for this site change from industrial purposes, then further investigations and potential remediation measures may be required;
- There is Total Petroleum Hydrocarbon contamination in all but one groundwater well tested. The concentrations are very variable. At times, TPH has not been detected in some wells, followed by a rebound in concentration some years later;
- PAHs were largely below the laboratories limit of detection, with no exceedances determined in any well since 2015;

- Concentrations of arsenic were variable and found in 6 different wells at elevated concentrations over the 10-year sampling programme. The levels are relatively stable and decreasing.

The facility implements strict procedures on the storage and bunding of oil and chemicals in order to protect the groundwater in the area.

2.2.5 Receiving Water

Under schedule C.5 of the Licence P0606-03, SSE Great Island must monitor for Trichloro-methane at ASW1 on a quarterly basis. A review of the 2017- 2019 results for ASW1 illustrated results are <1µg/l.

2.2.6 Noise Emissions

SSE generation station is located in the townland of Great Island, 3.5km west of Campile village and approximately 15km south of New Ross, Co. Wexford. It is located on the confluence of the River Suir and the River Barrow estuary.

The nearest neighbour is approximately 550m to the northwest of the facility, with the nearest area of settlement is at Cheekpoint, County Waterford, located approximately 700 metres to the south of the site. In Wexford, the nearest significant area of settlement is Campile, and is situated approximately 3.75 kilometres to the east.

Noise monitoring is completed annually by independent consultants in line with AG4 Guidance as issued by the EPA. A review of the noise monitoring results was undertaken for previous years. The site is monitored at 2 noise sensitive locations NSL1 and NSL2. Noise monitoring results for monitoring locations NSL1 and NSL2 are all compliant with emission limits values specified within the licence for both day and night time monitoring.

2.2.7 Geology/ Hydrogeology

The generation station was constructed on man-made ground, surrounded by an area of estuarine sediments of silt and clays, with a gravelly texture. The aquifer below is classified as regionally important fissured bedrock (Aquifer Code Rf) with extreme vulnerability. The installation is surrounded by areas of medium to high vulnerability and areas with rock very close or at the surface of the ground. Groundwater was classified under the water framework Directive with “good” status between 2010 and 2015.

2.2.8 Environmental and Ecological Designations

The facility is situated adjacent to the River Barrow and River Nore Special Area of Conservation (SAC), site number 002162. A Natura Impact Statement (NIS) was recently undertaken by an independent consultant, Aquafact International Services Ltd. on foot of an EPA audit query in relation to the impact of emissions from a chlorinated cooling water point which is emitting into the estuary at SW8. The report concluded that ‘conservation objectives and integrity of the SAC will not be adversely affected by the discharge’

The Barrow River Estuary is also a proposed Natural Heritage Area (pNHA).

2.2.9 Human Receptors

SSE generation station is located in the townland of Great Island, 3.5km west of Campile village and approximately 15km south of New Ross, Co. Wexford. It is located on the confluence of the River Suir and the River Barrow estuary.

The nearest neighbour is approximately 550m to the northwest of the facility, with the nearest area of settlement is at Cheekpoint, County Waterford, located approximately 700 metres to the south of the site. In Wexford, the nearest significant area of settlement is Campile, and is situated approximately 3.75 kilometres to the east.

2.2.10 Waste

Waste materials are generated at different locations within the building. Waste materials generated at the SSE Great Island can be classified as either hazardous or non-hazardous in accordance with the EU *European Waste Catalogue (EWC)* and *Hazardous Waste List*.

Non-hazardous waste from the facility is removed by approved waste contractors. Waste typically comprise of the following material types;

General	200301
Wood	170201
Scrap Metal	170407
Dry Mixed	150106
Sewage	200304
Oil Filters	160107
Non-hazardous waste	161002

Hazardous waste materials such as fluorescent lamps, waste oil, oily rags, aerosol cans, waste electrical and electronic equipment and other miscellaneous hazardous waste are managed by appropriately licensed contractors. Hazardous waste materials are temporarily stored externally within a designated bunded area prior to collection via returns policy with the suppliers or disposal by licenced contractors.

2.3 Compliance Record

Overall the site has an excellent compliance record, with incidents being managed and reported in an effective and timely manner. All incidents have been fully closed out to the satisfaction of the Agency.

There were 5 complaints in 2019, 4 of which related to foaming and overall water quality in the estuary. The 5th complaint related to a noise. All complaints have been managed and closed out to the satisfaction of the Agency.

Historically, there have been 2 significant incidents on site. Both incidents occurred under ESB management of the site.

- An oil spill during offloading which led to an oil leak into the estuary. This occurred in the 1970's.

- Maintenance work in 1985 which led to oil escaping from one of the tanks however it was fully contained within the bund.

2.4 Inventory of Materials On-site

Table 2.4 Material Inventory

Substance	Stored in (tank, cylinder)	Maximum Quantity (Tons)
Distillate Oil	Tank	1200
Ammonia (20%)	Tank	0.5
Sulphuric Acid 96%	Tank	0.3
Caustic Soda Liquor	Tank	0.3
Sodium Bisulphite (30%)	Tank	0.3
Sodium Hypochlorite (12%)	Tank	44
Trisodium Phosphate	Tank	0.5
Molydate Corrosion inhibitor	Tank	0.1
Gensys Antiscalant	Tank	n/a
Propane	Tank	5
Hydrogen	Tank	1

A copy of the tank and bund register for the site can be found in Appendix B.

3.0 Inventory of Assets

A full inventory of assets are available on request.

4.0 Closure Tasks and Programmes

This section will focus on the closure aspects of the activity, to include the decommissioning and decontamination of all structures related to the activity. The latter is in place to ensure the site does not pose an environmental risk following closure. Licence monitoring and insurance will remain in place for the entirety of the decommissioning process and until the Agency deems the site is successfully closed and poses no further threat to the environment.

Prior to the commencement of decommissioning, the CRAMP will be reviewed and updated as necessary with a programme of decommissioning which is approved by the EPA. Details of the aftercare and management of the on-site landfill will be agreed. A sample Gantt chart has been included in Appendix C of this report which details the likely steps and timing in relation to decommissioning of the site.

As the facility is owned by SSE Generation Ltd., it is envisaged that the plant would be sold. Furthermore, plant and equipment will be cleaned and decommissioned and may be sold. Some pipework/ drainage/ tanks may be left in-situ, however thorough cleaning will have been undertaken to ensure the site poses no risk of environmental contamination.

The activities associated with a closure of SSE Generation Ltd. Great Island, include;

- Cancellation of all supplies and raw materials;
- Return of unopened stock, gas bottles, solvents where applicable;
- Termination of contracts with suppliers/ relevant personnel. Environment and Safety personnel should be maintained to ensure the controlled wind-up of the company and its associated activities;
- Clean down of all plant and equipment to include all underground tanks, sumps, piping, bunds etc;
- Isolation, disconnection & removal of equipment, infrastructure, temporary bunding and redundant cabling;
- Structural review of all hardstand areas to ascertain risk of groundwater contamination;
- Emptying of all bulk storage, cleaning of tanks & lines and subsequent blanking of lines;
- Emptying of all underground sumps, drainage lines, silt trap and interceptor and subsequent blanking of lines;
- Clean down of all equipment and removal of waste associated with activities and administration;
- Removal and archiving of all company records and documentation;
- Shutdown, decontaminate and decommission gas turbine,
- Residual fuels to be removed from tanks and pipelines.
- Shut down, decontamination of utilities, water treatment system and ancillary equipment/ bunds, drainage following cleaning procedures;
- Decontamination of bulk tanks

- Cancellation and making safe utilities including gas and electricity.
- Decontaminate and decommission stores, offices etc. Removal of all residual waste to waste storage areas. WEEE to be removed by suitably permitted operator. All other wastes to be dispatched to waste storage areas.
- All wastes to be segregated, labelled and removed for waste recovery/disposal by suitably permitted operator. Clear and decontaminate waste storage areas.
- Clean silt trap and interceptor in the surface water network
- Segregate off landfill area and agree monitoring programme with the Agency.

It is estimated that full closure will take 12 months to complete following shut-down. It is envisaged that where possible in-house personnel will be used to decontaminate and decommission relevant areas of the site as part of an orderly winding down of the business. Suitably qualified sub-contractors will be contracted to handle hazardous materials or specialist operations.

5.0 Costing and Financing

Were SSE Great Island to close, it is envisaged that there would be an orderly wind down of business operations, from raw materials, fuel and a staffing point of view.

The CRAMP is based on the premise of the latter which would lead to a reduction in the amount of overall waste figures and works to be completed by external companies.

Table 5.0: Summary of Closure Costings

Task	Description	Quantity	Measurement Unit	Unit Rate	Cost	Source of Estimate
1	Removal & decontamination of stores/ workshops/ office areas etc.	90 days	General operatives – 5 operatives	2,380	214,200	EPA Costings & Client Information
2	Decommissioning of jetty & pipelines	1	Decommissioning of jetty & pipelines	60,000	60,000	EPA Costings & Client Information & Previous CRAMP
3	Decontaminating drainage including bunds, drains, silt & oil interceptor, sumps etc.	10	Decommissioning drainage including bunds, drains, silt & oil interceptor, sumps etc.	1500	15,000	EPA Costings & Client Information
4	Bulk HFO Storage Decontamination	1	Per tank farm	150,000	150,000	EPA Costings & Client Information
5	Other Chemical Bulk Storage Decontamination & Decommissioning	15 tanks/mobile bunds	Per 20-50 tonne external tanks & 1-5 tonne internal tanks	-	100,000	EPA Costings & Client Information
6	Decommissioning of infrastructure- gas turbine, boiler, water treatment system etc.	30 days	Decommissioning teams – 4 teams comprising of supervisor and general operatives	14,000/day	420,000	EPA Costings & Client Information & Previous Cramp
7	Waste Disposal/recovery- Hazardous waste	As per table	As per table 5.2 below	-	380,665	EPA Costings/ Industry experience
8	Waste Disposal/recovery- Non-hazardous waste	As per table	As per table 5.2 below	-	6,400	EPA Costings & previous values on similar works completed by Axis Environmental
9	Environmental Monitoring & Validation report requirements	As per table	As per table below 5.1 below	-	37,400	EPA Costings & previous values on similar works completed by Axis Environmental
10	Staffing during closure	2 people	12-month period	-	100,000	Information from client
11	Insurance	1	Public & Employer Liability- 12 months	175000	175,000	Information from client
12	Services	300,000 150,000 200,000	Gas -€1.20/l Water - €3/m3 Power -0.21/Kwh	360,000 27,000 42,000	429,000	EPA Costing, Information from Client
13	Security	12 months	Security	15,000	180,000	EPA Costings & previous values on similar works completed by Axis Environmental
15	Surrender of IEL	1		12,697	12,697	EPA Costings & previous values on similar works completed by Axis Environmental
Subtotal					2,280,362	
Contingency – 20%					456,072.40	
TOTAL					2,736,434	

5.1 Environmental Monitoring & Validation Report Requirements

As a result of the historical landfill on-site, an aftercare management programme will be necessary for the SSE Generation Ltd., Great Island site. Costs associated with the aftercare management programme of the landfill can be found in section 6.0 of this report.

An estimated cost associated with the generation of the monitoring and validation report for the power station is available in Table 5.1, with estimated waste costings in Table 5.2 below;

Table 5.1 Validation Report Costing for the Power Station

Description	Quantity	Measurement Unit	Unit Rate	Cost
CCTV surveys/ Drain testing	5	Days	4000	20,000
Soil Samples	12	Samples	400	4800
Groundwater samples	12	Sample	400	4800
Surface water samples	8	Sample	200	1600
Environmental monitoring	1	Monitoring personnel	600	1200
Validation report	1	Report	5,000	5,000
Total				37,400

5.2 Waste Management Costs

Table 5.2: Summary of Waste Management Costs

Task	Description	Quantity	Measurement Unit	Unit Rate	Cost
Hazardous	Waste batteries, light bulbs	1	tonne	395	370
	Lab Chemicals	1	tonne	395	395
	Cleaning & Sludge Disposal from Treatment plant/drainage & interceptor clean out	180	tonne	400	72,000
	Cleaning waste with oil / other hazardous residues etc.	750	tonne	400	300,000
	Contaminated packaging material & filters	50	tonne	395	7900
Non-hazardous	Metals	70	tonne	0	0
	Damaged Pallets	2	tonne	0	0
	Cardboard	30	tonne	0	0
	Non-hazardous Municipal waste recovery	20	tonne	200	4000
	Glass	1	tonne	200	200
	Old furniture/office equipment	10	tonne	200	2000
	Food waste	2	tonne	100	200
				Total	387,065

6.0 Restoration and Aftercare Management Plan

A restoration/ aftercare plan is normally required where there are outstanding environmental liabilities associated with the facility, primarily groundwater contamination issues or land form changes. The SSE Great Island site has a disused landfill within its boundary which will require a restoration and aftercare management plan. The landfill was operated until 2005.

Given the historical compliance of the site to date, it is expected that the site (excluding the landfill) will incur a clean closure. However for completeness, it is recommended that a full review of the integrity of the hardstand areas, drains, pipelines and bunds should be undertaken as part of the closure/ validation plan. Any signs of damage/ staining and/ or possible breach of containment should be examined further, in which case a sampling and monitoring programme may be undertaken. Areas at high risk of contamination, may include;

- Bulk storage tanks and bunds;
- Chemical mixing plant;
- Washing plant;
- Underground sumps.

The results of the latter monitoring will dictate the necessity and scope of any further remediation/ after care monitoring programme.

In the event of contamination being discovered, SSE Ireland will contact the Agency and ensure an appropriate plan of action relating to aftercare monitoring is put in place. The plan will specify the frequency and duration of sampling and may include the following;

- Surface water stream and river sampling and analysis;
- Soil sampling and analysis;
- Groundwater sampling and analysis;
- Staff resourcing;
- Site security requirements;
- Maintenance of drainage systems;
- Servicing and calibration of water quality monitors.

Following on from the results of this programme and depending on the type and levels of contamination discovered, the Agency may require further remediation.

The following criteria must be met in order for the facility to be deemed successfully decommissioned;

- Decommissioning plan implemented in line with a controlled environmental management system;
- Plant & equipment decontaminated using in-house cleaning procedures and approved contractors;
- Plant & equipment dismantled and removed off-site;
- Wastes managed in a controlled manner, to include correct packaging, storage, disposal/ recovery;
- Records maintained for all materials and waste removed from the site;
- Verification that groundwater and soil is free from contamination;
- Any additional environmental risks closed out to the satisfaction of the Environmental Protection Agency (EPA);
- Sufficient funds available to cover the cost of full closure.

6.1 Landfill Restoration and Aftercare Management Plan

Waste disposal activities were carried out at the site historically, with two areas of the site being used between the 1960's and mid 1990's for deposition of excess rock fill, building materials and spoil. Certain parts of a northern segment of Cell 1 was also used for deposition of general waste up until 2005. The CCGT does not impact on these areas in any way, however by IE Licence is required to monitor groundwater quality in the vicinity of these cells.

The generation station was constructed on man-made ground, surrounded by an area of estuarine sediments of silt and clays, with a gravelly texture. The aquifer below is classified as regionally important fissured bedrock (Aquifer Code Rf) with extreme vulnerability. The installation is surrounded by areas of medium to high vulnerability and areas with rock very close or at the surface of the ground. Groundwater was classified under the water framework Directive with "good" status between 2010 and 2015.

This section of the CRAMP, deals with the Restoration, Aftercare and Management Programme for the landfill and is based on the following;

- The landfill has been capped in line with international standards;
- There is no evidence of leaching;
- There is no requirement for any pump-out and or removal of waste.

Table 6.1 Landfill Aftercare Costs

Description	Quantity	Measurement Unit	Unit Rate	Cost
Groundwater Monitoring	6	Annual	400	2400
Monitoring costs	1	Day	600	600
Management/Security costs	1	Per month	500	5,000
		Annual		8,000
		Total for 10 years		80,000
Soil Samples	6	Once every 5 years	400	4,800
				84,800
		Contingency	20%	16,960
		Total		101,760

An overall liability of €2,736,434 for the closure of the power plant, with an addition of €101,760 for the aftercare management programme for the on-site landfill has been proposed, giving an overall Closure figure of €2,838,194 for the SSE Great Island Plant.

7.0 Future –Proofing costs

The costing on the closure and restoration plan have been generated based on information provided by SSE Generation Ltd., Great Island. A contingency of 20% has been included in the cost for both the Power Plant and Landfill Aftercare Programme to take account of a number of factors, including;

- ✓ Unknowns in relation to contamination issues at the time of writing this report;
- ✓ Inflation/ Discounting;
- ✓ Regulatory issues.

The EPA guidance has assumed that the closure cost of the facility will change over time and so have approved the following method for updating costs;

Where: $\text{Revised Cost} = (\text{Existing cost} \times \text{WPI}) + \text{CiCC}$

WPI: Appropriate wholesale price index, as published by the Central Statistics Office, for the year since the last calculation/revision. Based on the latest CSO figure for capital goods for February 2020. A figure of 107.7 has been used for capital goods for February 2020.

Capital Goods Price Indices (excluding VAT)						
Base: Year 2015 = 100						
	Index		Monthly % Change			Annual % Change
	Jan 2020	Feb 2020	Dec 2019	Jan 2020	Feb 2020	Feb 2020
Capital goods						
Building and construction (i.e. materials and wages)	108.3	108.1	-0.1	0.4	-0.2	0.5
All capital goods (CSO.ie)	107.9	107.7	-0.2	0.5	-0.2	0.7

CiCC: Change in compliance costs as a result of change of site conditions, law, regulatory authority charges or other significant changes.

Given the above calculation, the revised cost is calculated as;

Revised Cost= (Existing cost x WPI) + CiCC
 Revised Cost= (€2,814,026 x 107.7%) + (24,132.40)
 Revised Cost= (€3,030,706) +(24,132.40)

Revised Cost = €3,054,877 or an overall increase of €240,815.20

8.0 Financial Provision

It is recommended that the approved financial provision is increased to a value of **€3,054,877 an overall increase of €240,815.20** on the previously agreed figure of €2,814,026 following approval between SSE Generation Ltd., Great Island and the Agency on the acceptance of this Closure, Restoration and Aftercare Management Plan (CRAMP).

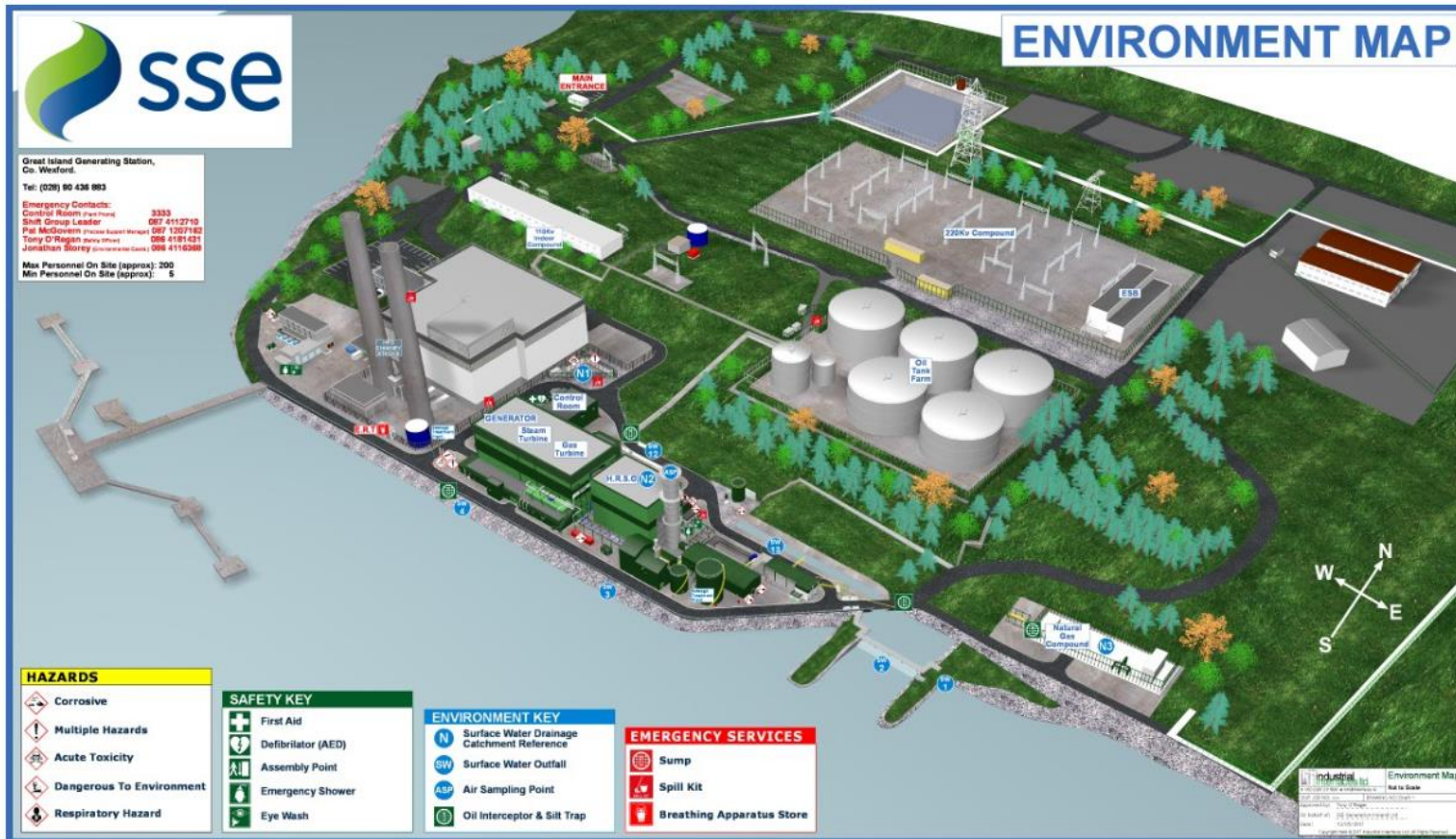
9.0 Validation Report

Following the completion of the closure plan, SSE Generation Ltd. are required to submit a validation report in line with condition 10.4 of IE Licence P0606-03 which states;

'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 validation report will include a summary of the closure, restoration and aftercare management programme undertaken, including records of disposal, decontamination and monitoring. The report will be submitted to the Agency within three months of execution of the plan. SSE Generation Ireland Ltd will also be required to submit an application for surrender of their licence. Only upon the acceptance by the Agency of the report findings may the facility change ownership.

Appendix A Site Schematic



Appendix B Tank & Bund Register

Location	Bund	Location	Type	Bund Capacity (m3)	Tank Capacity
HFO	T101	Exterior North Wall	Oil	51.1	6244 Gallons (approx. 28386 Litres)
HFO	T102	Exterior North Wall	Oil	51.1	6244 Gallons (approx. 28386 Litres)
HFO	ST101	Exterior North Wall	Oil	41.8	3040 Gallons (approx. 13820 Litres)
HFO	North East station	Oil		26,000m3	5 x 16490m3
CCGT	O4BAT10	Main Transformer	Oil	120.412m2	109,000Litres
CCGT	O4BBT10	Aux Transformer	Oil	9.157m2	
CCGT	Sodium Hypochlorite	Adjacent to pumphouse	Chemical	80.1	43,000 l
CCGT	Chemical Dosing	Cycle Chemical dosing skid	Chemical	9.6	2500 l (3 tanks)
CCGT	Sulphuric Acid	WTP	Chemical	0.54	250 l
CCGT	Sodium Bisulphite	WTP	Chemical	0.616	500 l
CCGT	Antiscalant	WTP	Chemical	0.51	250 l
CCGT	Caustic Soda	WTP	Chemical	0.698	500 l
CCGT	Sodium Hypochlorite	WTP	Chemical	0.43	400 l
CCGT	Corrosion Inhibitor	South Road	Chemical	0.336	100 l
CCGT	Chem store bunds (6 bunds)	Chemical storage area	Chemical	1.1	1000l
CCGT	Chem. Stores Bund (oils and greases)	Exterior	Chemical	1,200m3	
CCGT	Lube Oil Bund	New Turbine hall	Oil	41.25	34 m3
CCGT	Control Oil Bund	New Turbine hall	Oil	4.68	1300 l
CCGT	Fuel Oil	Exterior	Oil	1.62	n/a (pipework)
CCGT	31 x Mobile site bunds	Various	various	1.2m3	Various sizes
CCGT	Sulphuric Acid & Sodium Bisulphite	WTP - outside	Chemical	1.1	1000l
CCGT	Caustic/hypo/antiscalant	WTP - outside	Chemical	1.1	1000l
CCGT	Ammonia	Auxy Boiler	Chemical	1.1	1000l
CCGT	Ammonia	Cycle Chemical dosing outside	Chemical	1.1	1000l
CCGT	Auxiliary Boiler house lube oil	Auxy Boiler	oil	0.35	
CCGT	Settling Pond	North of outfall	Oily/Water	334	n/a
CCGT	Stepup Transformer	Lower yard	Oil	570	500
CCGT	oil storage tank double skinned	chemical compound	Oily/Water	n/a	3000
CCGT	oil storage tank double skinned	north tank farm	Oily/Water	n/a	3000

Appendix C Gantt Chart illustrating Sample Timeline & Description of Works

Item no.	Description	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1	Planned Power Production Cessation Notification to Statutory Bodies, Employees and Other Stakeholders				
2	Review of CRAMP & Agreement with EPA on Qualifications for Clean Closure				
3	Stock take to allow for run-down of stock, fuel, spare parts etc.				
4	Set up & establish contacts with specialist contractors required for decommissioning including environmental consultants which will complete the validation audit.				
5	Establish timelines of employment for permanent staff				
6	Establish Cleaning procedures for various areas of the site				
7	Establish mechanism of recording of decommissioning works ensuring activities continue to be managed through the Environmental Management system for the site.				
8	Complete monitoring programme for soils & groundwater to establish the need for an aftercare management programme. Review all hardstand areas etc. for damage. Feed the results of this analysis into the CRAMP and ensure any aftercare monitoring is accounted for.				
9	Cease energy production				
10	Isolate fuel (gas and oil) supplies				
11	Complete stock take and return all spare stock, spare parts etc.				
12	Begin decontamination and archiving of records in all areas.				
13	Drain down all chemicals on site from all tanks and pipelines, ensuring safe disposal. Liaise with appropriate waste contractors to ensure all materials are handled appropriately.				
14	Ensure all tanks and pipelines are decontaminated and wash waters are handled appropriately				
15	Start decontamination & decommissioning work in production, utility & workshop areas of the site to include gas & steam turbine, skids, boilers, water treatment facilities, chemical tanks etc.				
16	Block all drainage outlets from the site and begin decontamination of bunds, sumps, drains and pipework. Ensure all wash waters are captured and disposed of appropriately				
17	Finalise decontamination and removal of obsolete equipment in all areas. Complete an internal audit of all areas including a snag list of all outstanding issues for resolution				
18	Clean silt trap and interceptors on-site. Ensure all wash waters are captured and disposed of appropriately				
19	Finalise site works and ensure a validation audit is prepared for the site.				
20	Surrender IE licence & Submit validation report to the EPA and await approval before site can be exchanged				