

***This Report has been cleared for submission to the Director by Programme Manager,  
Marie O'Connor***

**Signed:**

*Marie O'Connor*

**Date: 01/02/2022**



**OFFICE OF ENVIRONMENTAL  
SUSTAINABILITY**

**INSPECTOR'S REPORT ON AN INDUSTRIAL EMISSIONS LICENCE  
REVIEW, LICENCE REGISTER NUMBER P0606-04**

**TO: DIRECTORS/SHARON FINNEGAN**

**FROM: JIM JOHNSON**

**DATE: 01 FEBRUARY 2022**

Applicant:	SSE Generation Ireland Limited
CRO number:	459400
Location/address:	Great Island Generating Station, Campile, New Ross, County Wexford
Application date:	29 September 2020
Classes of Activity (under EPA Act 1992 as amended):	2.1 Combustion of fuels in installations with a total rated thermal input of 50 MW or more.
Category/ies of activity under IED (2010/75/EU):	1.1 Combustion of fuels in installations with a total rated thermal input of 50 MW or more
Main CID:	2017/1442/EU Commission Implementing Decision (CID) on BAT Conclusions for Large Combustion Plants
All relevant BREF documents are listed in the appendix of this report.	
Activity description:	Operation of a natural gas fired power plant with a rated thermal input of 795 MW.
Additional information received:	Yes (07/05/2021, 04/06/2021, 08/06/2021, 21/06/2021, 16/07/2021, 11/11/2021, 13/11/2021, 10/12/2021)
No of submissions received:	16
Environmental Impact Assessment required: Yes	Stage 2 Appropriate Assessment required: Yes
Environmental Impact Statement submitted (EIS): Yes (07-May-2021, 08-June-2021)	Natura Impact Statement (NIS) submitted: Yes (29-September-2020)
Site visit: 14 October 2021	Site notice check: 21 June 2021

## **1. Introduction**

SSE Generation Ireland Limited has applied to the Agency for a review of Industrial Emissions licence P0606-03. The licence is for a gas fired electricity generation station at Great Island, Co. Wexford. The main reason for the review is to seek the authorisation of a discharge of wash water from the cooling water intake screens. This discharge had been permitted in the licence for the heavy fuel oil plant at the site (emission reference SW8) but was omitted for the gas fired power plant that replaced it. Further details are given under 'Reason for the Review' below. The licence has also been updated in line with BAT Conclusions for the Large Combustion Plant (LCP) sector.

SSE Generation Ireland Limited, is a subsidiary of SSE (formerly Scottish and Southern Energy) PLC — an energy utility company listed on the London Stock Exchange.

### **Site history**

The original power station at Great Island was a heavy fuel oil (HFO), 240 MWe (megawatt electrical) power plant built in the late 1960s and operated by the ESB. In 2003 an IPPC licence was issued to the ESB to operate the plant (P0606-01).

In 2005, the licence was revised (P0606-02) to provide for participation of the combustion plant in the National Emission Reduction Plan (NERP). In 2009 the power station was sold to Endesa Ireland Ltd.

In 2011 the licence was reviewed (P0606-03) to allow for the replacement of the heavy fuel oil plant with a new gas-fired, combined cycle gas turbine (CCGT) power plant. The licence includes emission limits for operation of both the HFO plant and the CCGT.

In October 2012, the licence was transferred from Endesa Ireland Ltd to SSE Generation Ireland Limited.

In December 2013, the licence became an Industrial Emissions licence (2010/75/EU). The activity falls under category 1.1 of Annex I of the Directive - Combustion of fuels in installations with a total rated thermal input of 50MW or more.

In 2015, the new CCGT plant began commercial operation and the HFO plant ceased operation.

### **Reason for the Review**

The CCGT was constructed within the grounds of the old HFO plant and uses the surface water drainage system on the site. However, in the licence review (P0606-03), the applicant, Endesa Ireland Ltd indicated that the number of surface water discharges would be reduced from twelve to six. Emission points SW7 and SW8 were no longer to be included and as a result the current licence required these emissions to cease upon commencement of the CCGT plant. SW7 consists of a storm water discharge from a decommissioned engine room. SW8 is wash water from the band screens which remove debris from the intake cooling water.

The discharge at SW7 ceased, but during an OEE site visit in 2019, it emerged that the discharge at SW8 had continued. The licensee (SSE Generation Ireland Limited) indicated that this emission had not ceased upon commencement of the CCGT as the intake screens are essential for supply of cooling water and the operation of the plant. They further indicated that it was never intended to cease this discharge. The licensee was instructed to submit a change request to rectify and regularise this discharge.

In February 2020, the licensee submitted a request for a technical amendment to be allowed continue discharging at SW8 and to reinstate SW7. The technical request could not be accommodated on the basis that it constituted an increase in the permitted total mass emission of chlorine (from SW8) and mineral oil (SW7 had an emission limit for mineral oil under P0606-03) from the installation.

In September 2020, the licensee applied to the Agency to review the licence. The reasons for the review are as follows:

- to authorise the discharge of screen wash water from emission point SW8;
- to authorise the discharge of storm water at SW7;
- to update the licence in line with BAT conclusions for the LCP sector — Commission Implementing Decision (EU) 2017/1442 (BAT Conclusions for Large Combustion Plants) and
- to update the frequency of stormwater monitoring in Schedule C.2.3. Stormwater is monitored every month as agreed by the Agency, but the current licence states daily frequency.

No changes have been requested with respect to other surface water emissions, air emissions (other than the inclusion of BAT conclusions), noise emissions or waste.

## **2. Description of activity**

The licensed activity is Class 2.1 of the First Schedule to the 1992 EPA Act as amended — Combustion of fuels in installations with a total rated thermal input of 50 MW or more. The plant consists of a natural gas fired Combined Cycle Gas Turbine (CCGT) power plant with gas oil as backup fuel. The plant has a rated thermal input of 795 MW (464 MW electrical output) with an electrical efficiency of approximately 58%.

The CCGT plant was constructed on the site of a heavy fuel oil (HFO) ESB power plant which has since been decommissioned. The plant is located on the confluence of the River Suir and the River Barrow estuary (location map - Appendix 1).

The CCGT plant consists of a gas turbine and a steam turbine operating on the same electrical generator. In the gas turbine, natural gas and compressed air are combusted and the resulting hot gasses pass through a turbine section driving the generator. The exhaust from this process is used in a boiler to convert water to high pressure steam which drives a second turbine, and which is also connected to the electrical generator producing additional power. Natural gas is supplied to the site by Gas Networks Ireland (GNI).

The water used in the steam cycle is demineralised water which is cooled in a condenser and circulated back to the boiler for reuse. Approximately 1% of water circulating in the boiler is “blown-down” to prevent the build-up of salts. Demineralised water is generated at a treatment plant supplied by potable water. The condenser is cooled by a once-through cooling system—water is abstracted from the estuary and passed through the condensers before being discharged back to the estuary via an outfall culvert (SW2). Sodium hypochlorite is added at the cooling water intake to prevent larval organisms in the estuary water colonising the surfaces of the cooling circuits. The cooling water is then passed through a series of screens to remove debris. The screens are backwashed every hour (or more frequently if blocked) to dislodge the debris. This wash water is discharged to the estuary at SW8.

Gas oil is used for routine testing (as required by CRU) and otherwise would only be used in the event of an emergency (i.e. an interruption in the gas supply). As a result, the hours of operation on gas oil are limited; between 2015 and 2021, gas oil was used for a total of 294 hours. Gas oil is stored in bunded tanks on site and filled from ships from the SSE owned jetty. The Commission for Regulation of Utilities (CRU) requires sufficient back-up fuel supply to operate the plant continuously for five days.

The electrical power generated is transferred via an underground cable to an ESB Networks owned switchyard on site. The plant is available to operate on a continuous basis, 24 hours a day, 365 days a year with personnel working on a shift arrangement. The actual number of working hours is determined by EirGrid who manage the electricity supply network.

The main emissions to the environment are exhaust gases from the CCGT, cooling water, process water from the CCGT (boiler blowdown, demineralisation water treatment plant effluent), screen wash water and treated wastewater effluent. The activity also generates noise.

### **3. Planning Status**

A number of planning applications have been made by the licensee for the area within the installation boundary. Details of these relevant planning applications and permissions have been provided in the application form.

Planning permission for the CCGT was sought directly from An Bord Pleanála under section 37A of the Planning and Development (Strategic Infrastructure) Act 2006 on 3 December 2009 and was granted on 29 July 2010 (Ref. 26.PA0016).

The licensee has submitted the EIS (Environmental Impact Statement) associated with planning permission (Ref. 26.PA0016). The Agency has had regard to the reasoned conclusions reached by An Bord Pleanála in undertaking its environmental impact assessment of the activity.

### **4. EIA Screening**

In accordance with Section 83(2A) of the EPA Act 1992, as amended, the Agency must ensure that before a licence or revised licence is granted, the application is made subject to an environmental impact assessment (EIA), where the activity meets the criteria outlined in Section 83 (2A)(b) and 83 (2A)(c).

In accordance with the EIA Screening Determination, the Agency has determined that the activity is likely to have a significant effect on the environment, and accordingly has requested the Environmental Impact Statement (EIS) associated with planning for the development (Ref: 26. PA0016) and is carrying out an assessment for the purposes of EIA.

The activity exceeds the following threshold in Part 1 of Schedule 5 of the Planning and Development Regulations 2001 as amended: *2(a) A thermal power station or other combustion installation with a heat output of 300 megawatts or more.*

The EIS was requested by the Agency on 09 March 2021 and it was subsequently submitted by the licensee in support of this IE licence application on 07 May 2021 (Main Report) and 08 June 2021 (Appendices).

## **5. Best Available Techniques**

BAT for the installation was assessed against the BAT conclusions contained in the Commission Implementing Decision (CID) specified on page one of this report as well as in the BREF documents specified in the appendices of this report.

A detailed BAT assessment was carried out by the licensee and is included in Attachment 4-7 of the application form. Additional conditions to be incorporated into the RD to address BAT Conclusions are detailed in Appendix 6 of this report. Any relevant BAT Associated Emission Limits (BAT-AELs) are specified in the emissions sections of this report.

I consider that the applicable BAT Conclusion requirements are addressed through the technologies and techniques as described in the application, as well as the conditions and limits specified in the RD.

## **6. Emissions**

### **6.1 Emissions to Air**

This section addresses emissions to air from the installation and the environmental impact of those emissions.

#### **6.1.1 Channelled Emissions to Air**

There are two main emissions to atmosphere—waste gases from the CCGT stack and from an auxiliary boiler stack.

Two auxiliary boilers supply steam to the CCGT during start-up and shut-down periods. The boilers have a combined thermal input capacity of 30.8 MW (15.4 MW each) and use the same fuels as the CCGT. The boilers discharge through a common stack. Emission limit values and monitoring requirements have been applied in accordance with the MCP Regulations.

Waste gases from the CCGT are discharged through a 60m high stack. The licensee has not proposed any changes in emissions to air from the CCGT. The current licence, as amended by Technical Amendment C (2015), specifies emission limit values (ELV) in line with the LCP Regulations 2012 (S.I. No. 566 of 2012). The installation has been compliant with these ELVs.

The CCGT uses the following techniques to minimise emissions:

- The gas turbine is fitted with a dry low NO<sub>x</sub> (DLN) burner to reduce nitrogen oxide (NO<sub>x</sub>) emissions when operating on natural gas. Air and fuel are premixed before entering the combustion zone. This helps control the flame temperature and lower NO<sub>x</sub> emissions. Dry low NO<sub>x</sub> burners are generally effective above a particular plant load.
- Water injection is used to reduce NO<sub>x</sub> when operating on gas oil.
- The combustion system is maintained according to the equipment manufacturers recommendations.
- The combustion system is fitted with an advanced computer-based control system to control combustion efficiency.

These techniques are considered BAT for the installation.

The licensee requested the licence be updated in line with BAT Conclusions for Large Combustion Plant (CID 2017/1442/EU). For SO<sub>x</sub> and Dust when operating on gas oil, the daily ELVs in the current licence pre-date the LCP Regulations (2012) and the LCP BAT Conclusions. The licensee has proposed that these ELVs be retained.

The emission limits proposed by the licensee and those in the relevant legislation are summarised in the tables below. Separate limits apply for the CCGT operating on natural gas and gas oil.

Fuel type	Parameter (mg/Nm <sup>3</sup> )	Proposed by applicant	LCP Regulations (2012)	BAT Conclusions for LCP (BAT AEL)	
				Daily average	Yearly average
Natural gas	NO <sub>x</sub> (as NO <sub>2</sub> )	50	50 (Note 1)	18–50 (Note 2)	10–40 (Note 2)
	CO	100	100 (Note 1)	No BAT-AEL	<5–30 (Note 2) (Note 3)

Note 1: Emission limit values apply only above 70 % load.

Note 2: In the case of a gas turbine equipped with dry low NO<sub>x</sub> burners (DLN), these BAT-AELs apply only when the DLN operation is effective as set out in BAT 44 of the LCP BAT Conclusions.

Note 3: As an indication as set out in BAT 44 of the LCP BAT Conclusions.

Fuel type	Parameter (mg/Nm <sup>3</sup> )	Proposed by applicant	LCP Regulations (2012)	BAT Conclusions for LCP (BAT AEL)	
				Daily average	Yearly average
Gas oil	NO <sub>x</sub> (as NO <sub>2</sub> )	90	90 (Note 1)	No BAT-AEL (Note 2)	No BAT-AEL
	SO <sub>x</sub> (as SO <sub>2</sub> )	50	-	50–66 (Note 3)	35–60 (Note 4)
	Dust	20	-	2–10 (Note 3)	2–5 (Note 4)
	CO	100	100 (Note 1)	No BAT-AEL	No BAT-AEL

Note 1: Emission limit values do not apply to gas turbines that operate less than 500 hours per year.

Note 2: As an indication, the emission level for NO<sub>x</sub> emissions to air from the combustion of gas oil in dual fuel gas turbines for emergency use operated less than 500 hours per year will generally be 145–250 mg/Nm<sup>3</sup> as a daily average or average over the sampling period.

Note 3: For existing plants operated less than 500 hours per year these levels are indicative.

Note 4: These BAT-AELs do not apply to existing plants operated less than 1,500 hours per year.

### Air dispersion modelling

As part of the application, air dispersion modelling was carried out to predict the ambient pollutant concentrations resulting from the CCGT stack emissions when operating on natural gas. The modelling carried out was in accordance with published Agency guidance and was considered sufficiently detailed and conservative to assess the impact of the main emissions to air.

Hourly meteorological data over a five-year period (Johnstown Castle, 2012 – 2016) was used in the model. The area around the power station is categorised as Air Quality Zone D by the EPA. Background concentrations were used from Enniscorthy Zone D Urban monitoring station, which had the highest annual average values of the Zone D

monitoring locations in the period 2011-2015. Detailed terrain data has been incorporated into the modelling assessment and building wake effects were also included.

The table below gives details of the predicted impact of the relevant pollutants at the ELVs specified in the RD.

Parameter	Averaging Period	Background concentration ( $\mu\text{g}/\text{m}^3$ )	Process contribution to PEC ( $\mu\text{g}/\text{m}^3$ )	Predicted Environmental Concentration (PEC) ( $\mu\text{g}/\text{m}^3$ )	PEC as % of Air Quality Standard	Air Quality Standards/ Guidelines ( $\mu\text{g}/\text{m}^3$ ) Note 1
Nitrogen Oxides (as $\text{NO}_2$ )	99.8%ile hourly (2014)	22	117	139	69%	200
	Annual Mean (2015)	11	2.3	13.3	33%	40
Carbon monoxide (CO)	Maximum 8 hour (2016)	1,000	180	1,180	12%	10,000

Note 1: Air Quality Standards Regulations, SI 58/2009 and 180/2011, unless otherwise stated.

As can be seen from the table the predicted environmental concentrations do not exceed the relevant air quality standards or guideline values. It should be noted that a conservative approach was taken in the air dispersion modelling. Background concentrations were from an urban Zone D location (Enniscorthy), in reality the background concentrations will be lower as the installation is located in a rural area. The predicted concentrations arise under conditions of maximum emissions combined with worst-case meteorological conditions. In addition, maximum predicted concentrations are reported, even if no residential receptors are at that location.

The Air Quality Standards Regulations 2011 specifies an annual limit value for  $\text{NO}_x$  for the protection of ecosystems and vegetation of  $30 \mu\text{g}/\text{m}^3$ . The air dispersion modelling results indicate that the ambient ground level concentrations are below the relevant air quality standard for  $\text{NO}_x$  for the protection of ecosystems.

Air dispersion modelling for the CCGT operating on gas oil was carried out and assessed as part of the previous licence review. As mentioned above, gas oil usage is limited for short periods when testing. The results of the modelling are included in Appendix 3 of this report. The predicted environmental concentrations do not exceed the relevant air quality standards or guideline values.

In light of the above, the Recommended Determination specifies ELVs in accordance with the LCP Regulations 2012 and BAT Conclusions for LCP as outlined below.

#### Emission limit values applied in the RD - CCGT operating on natural gas

##### NO<sub>x</sub>

Daily and yearly average limits are applied in line with the LCP BAT Conclusions. The hourly and monthly limits are derived from the LCP Regulations. The emission limits for  $\text{NO}_x$  in the current licence only apply above 70% load; however, the RD applies  $\text{NO}_x$  limits irrespective of load. Under the BAT Conclusions, emission limits apply when the operation of the dry low  $\text{NO}_x$  burner (DLN) is effective. Based on emissions data

from the plant, I consider the DLN to be effective irrespective of load when the turbine is operating outside of start-up and shut-down periods.

#### CO

The limit of 100 mg/Nm<sup>3</sup> from the LCP Regulations is retained. This applies above 70% load. The BAT Conclusions include an indicative yearly average CO emission level of <5 – 30 mg/Nm<sup>3</sup> for existing CCGT ≥ 50 MWth; with the higher end of this range to be generally 50 mg/Nm<sup>3</sup> for plants that operate at low load (cf Table 24 of CID 2017/1442/EU), and applicable when the DLN is effective. The licensee has indicated that CO emissions increase exponentially as load decreases and the plant is often close to the CO limit of 100 mg/Nm<sup>3</sup> when the turbine load is at a minimum. They further state that applying a yearly average ELV of less than 100 mg/Nm<sup>3</sup> would require the plant to be shut down during periods of low load which would result in more frequent start-ups and an overall increase in NO<sub>x</sub> and CO emissions. Air dispersion modelling has demonstrated that operating the plant at the limit of 100 mg/Nm<sup>3</sup> will not cause significant pollution – the process contribution is less than 2% of the AQS. On this basis, a yearly average CO emission limit of 100 mg/Nm<sup>3</sup>, applicable above 70% load has been applied in the RD.

#### SO<sub>x</sub>, Dust

The RD does not specify ELVs for SO<sub>x</sub> and dust as they are not environmentally significant for natural gas combustion in gas turbines and emission limits are not specified in the LCP Regulations or LCP BAT Conclusions.

#### Emission limit values applied in the RD - CCGT operating on gas oil

The current licence limits the use of gas oil to periods when there is an interruption in gas supply and for testing purposes as required by the CRU. This condition is carried forward in the RD (Condition 3.18).

#### NO<sub>x</sub>

The ELV of 90 mg/Nm<sup>3</sup> is retained. This limit is from the LCP Regulations and applies when the plant operates for 500 hours or more per year. For less than 500 hours/year operation an average daily limit of 120 mg/Nm<sup>3</sup> is applied which was the emission concentration assessed with modelling in the previous licence review. This is a tighter limit than the indicative ranged in the LCP BAT Conclusions (145–250 mg/Nm<sup>3</sup>).

#### CO

An ELV of 100 mg/Nm<sup>3</sup> is applied in line with the LCP regulations. This is unchanged from the current licence.

#### SO<sub>x</sub>

An ELV of 50 mg/Nm<sup>3</sup> is carried forward from the current licence. This limit meets both the daily and yearly-average ELV in the LCP BAT Conclusions.

#### Dust

The ELV of 20 mg/Nm<sup>3</sup> is carried forward from the current licence. A lower daily average limit 10 mg/Nm<sup>3</sup> applies when operating at least 500 hours/year and a yearly average limit 5 mg/Nm<sup>3</sup> applies when operating at least 1,500 hours/year in line with the LCP BAT Conclusions.

#### Minor emissions

There are other emission points to air at the installation which, due to their emission characteristics are not considered environmentally significant and are therefore



regarded as minor emissions. These minor emissions are not considered as part of this impact assessment.

## 6.2 Emissions to Water/Ground

### 6.2.1 Emissions to Surface Waters

The licensee has requested one change to process emissions to surface waters – the authorisation of a screen wash water discharge at **SW8**. This discharge had been authorised previously for the HFO plant with a volumetric flow limit of 1,970 m<sup>3</sup>/day and a chlorine limit of 0.5 mg/l. The licensee has requested the same volume flow limit and proposes to decrease the chlorine limit to 0.3 mg/l. They have been monitoring the chlorine concentration at **SW8** since the OEE site visit in June 2019, and it has been below 0.3 mg/l. The other surface water emissions are compliant with the conditions of the licence and the licensee has not requested any changes to them. The table below gives details of the installation's process emissions to waters in the current licence and the proposed emission at SW8.

Emission Reference	Process Description and abatement where applicable	Max. volume (m <sup>3</sup> /day)	Parameter	ELV in P0606-03 and proposed at SW8
SW2	Condenser cooling water	792,000	Temperature	12°C above estuarine water 10°C (98%ile of hourly values over a year) See also Condition 5.7
			Thermal Load (MW <sub>th</sub> )	330 MW <sub>th</sub> (maximum) 316 MW <sub>th</sub> (98%ile of hourly values over a year)
			Chlorine (mg/l)	0.3
SW3a	Wastewater treatment plant treating sanitary waste from toilets, washrooms and canteens	9.5	pH	6 – 10
			BOD (mg/l)	25
			Suspended Solids (mg/l)	35
			Ammonia (mg/l)	5
			Total Phosphorus (mg/l)	2
SW8 (proposed)	Cooling water intake screen wash water	1,970	Chlorine (mg/l)	0.3
SW13	Process water from CCGT consisting of boiler blowdown, water treatment plant effluent and condensate drain waste. Discharges to a homogenisation tank (pH adjustment, flow, conductivity, temperature monitoring)	-	pH	6 – 9
			BOD (mg/l)	20
			Suspended Solids (mg/l)	30
			Total Dissolved Solids (mg/l)	5,000
			Mineral Oil (mg/l)	20
			Ammonia (as N)	5
			Total phosphorus (as P)	5

Note: at the time of the review the waste water treatment plant (SW3a) was not in operation and sanitary waste water was being tankered off site by an authorised waste contractor for treatment at an authorised facility.

The installation is located at the intersection of three Water Framework Directive (WFD) waterbodies (map Appendix 1), details of which are included in the table below.

<b>Waterbody name</b>	New Ross Port	Lower Suir Estuary (Little Island - Checkpoint)	Barrow Suir Nore Estuary
<b>WFD code</b>	IE_SE_100_0200	IE_SE_100_0500	IE_SE_100_0100
<b>Waterbody type</b>	Transitional	Transitional	Transitional
<b>WFD status (2013-2018)</b>	Moderate	Good	Moderate
<b>Transitional Water Quality 2018-2020</b>	Intermediate	Intermediate	Intermediate
<b>WFD risk</b>	At risk	At risk	At risk
<b>WFD protected areas:</b>			<b>Distance to emission:</b>
River Barrow and River Nore SAC			0 m
Lower River Suir SAC			~950 m
Shellfish Area - Waterford Harbour (Checkpoint/Arthurstown/Creadan)			~200 m
<p><b>Shellfish classification (EC Regulation 854/2004)<sup>1</sup>:</b> All Beds – Mussels (Class B) (Dormant Fishery); Harry Lock Bay - Surf Clams (Class A); Woodstown – Oysters (Class A – Seasonal). <b>Pollution Reduction Programme:</b> Revised/Updated Waterford Harbour Pollution Reduction Programme (2012).</p> <p>The Marine Institute assessed the average dissolved concentrations for metals in shellfish waters for the period 2016-2019 and the microbial quality in shellfish flesh for 2018. This assessment was used to determine if the WFD protected area objective for shellfish areas was met. The protected area objectives for shellfish were met in the three WFD waterbodies above.</p> <p><b>General comment:</b>  <u>WFD Status<sup>2</sup>:</u>            Under the WFD third cycle risk characterisation the three transitional waterbodies have been characterised as at risk of not meeting good status. The main issue in the estuary is elevated inorganic nitrogen which is impacting oxygen availability. Nutrient pollution from diffuse agriculture has been identified as the significant pressure. The installation at Great Island has not been identified as a significant pressure.</p> <p><u>Shellfish waters:</u>            The Waterford Harbour Pollution Reduction Programme (2012) suggested the key pressures on Shellfish were from urban wastewater systems, on-site waste water treatment systems and agriculture. The installation at Great Island was not identified as a key pressure.</p> <p><u>Special Areas of Conservation (SAC):</u>            Between 2016 and 2018 marine Annex I habitats across the country were surveyed to assess their conservation status<sup>3</sup>. The survey included the three marine habitats in the Barrow Estuary that are</p>			

<sup>1</sup> 2021/2022 List of Classified Bivalve Mollusc Production Areas in Ireland (09<sup>th</sup> July 2021) (Sea-Fisheries Protection Authority).

<sup>2</sup> 3rd Cycle Draft Barrow Catchment Report (HA 14) Catchment Science & Management Unit Environmental Protection Agency August 2021 Version no. 1

<sup>3</sup> Scally, L., Pfeiffer, N. and Hewitt, E. (2020) The monitoring and assessment of six EU Habitats Directive Annex I Marine Habitats. *Irish Wildlife Manuals*, No. 118. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

qualifying interests for the River Barrow and River Nore Special Area of Conservation (SAC): Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140] and Reefs [1170]. The survey found these habitats to be at favourable conservation status within the estuary.

### Assessment

As stated above this application for a review of a licence proposes one change with respect to emissions to surface waters – the authorisation of an emission at SW8 with a chlorine ELV of 0.3mg/l. The main emission of chlorine from the installation comes from the discharge of cooling water at SW2. The inclusion of SW8 will increase the permitted mass emission of chlorine by less than 1%. The emission at SW2 has been the subject of a number of complaints since 2016 and the subject of a number of submissions under the licence review. As a result, this assessment will address the total chlorine emission permitted from the installation (SW2 and SW8 combined). The licensee has been compliant with the chlorine limit at SW2, so the focus is to determine whether the chlorine limits applied to SW2 and SW8 protect the receiving water from significant impacts.

It should first be noted that the discharges currently licensed are of a similar physicochemical nature to that which had been authorised under the operation of the heavy fuel oil fired plant; however, both the volume and chlorine concentration limits were significantly reduced under the revised licence issued in 2011, which licensed the operation of the CCGT. The table below outlines the emission limits for SW2 and SW8 under the HFO plant and the CCGT in the current licence.

Parameter		Emission Limit Value	
		HFO Plant	CCGT
Volume to be emitted	Maximum in any one day	1,204,080 m <sup>3</sup>	792,000 m <sup>3</sup> <sup>Note 1</sup>
	Maximum rate per hour	50,170 m <sup>3</sup>	33,000 m <sup>3</sup>
Temperature		15°C above estuarine water 12 °C (98%ile of hourly values over a year) See also Condition 5.7	12°C above estuarine water 10°C (98%ile of hourly values over a year) See also Condition 5.7
Thermal Load		352 MW <sub>th</sub> (maximum) 335 MW <sub>th</sub> (98%ile of hourly values over a year)	330 MW <sub>th</sub> (maximum) 316 MW <sub>th</sub> (98%ile of hourly values over a year)
Chlorine (mg/l)		0.5mg/l	0.3mg/l

**Note 1:** The daily volume in the licence was originally 600,000 m<sup>3</sup>. This changed to 792,000 m<sup>3</sup> by Technical Amendment to be in line with the hourly volume limit.

Dosing with sodium hypochlorite is a widely used technique for the maintenance of once-through cooling systems and is recognised as BAT provided it is adequately controlled<sup>4</sup>. The chlorine acts as an oxidant and is consumed through reactions with organic and inorganic materials and any residual chlorine (residual oxidant) is discharged at the outflow. The amount of chlorine consumed (chlorine demand) depends on a number of factors including temperature, pH and organic matter content of the cooling water. Chlorine decays rapidly in the aquatic environment through exposure to sunlight and reactions with inorganic and organic compounds. The main

<sup>4</sup> JRC, DIRECTORATE-GENERAL. (2001). Integrated Pollution Prevention and Control (IPPC) Reference Document on the application of Best Available Techniques to Industrial Cooling Systems.

environmental issue is to prevent the formation of halogenated hydrocarbons, also called chlorinated by-products, which can be toxic to marine biota<sup>4</sup>.

The licensee carried out an assessment of the effects of the chlorine discharge on the estuary consisting of a surface water modelling report and an ecological survey.

The modelling assessment was undertaken to simulate the physical behaviour of the cooling water plume and the spatial and temporal changes in hypochlorite and pH due to mixing and dispersion in the estuary. The output from the dispersion model predicted chlorine concentrations of about 0.2 mg/l within 100m of the discharge point for a short period during the tidal cycle and that the concentration would decrease rapidly away from the discharge due to dispersion and dilution. In order to validate the model, a chemistry sampling survey was conducted in June 2021 (02<sup>nd</sup> and 09<sup>th</sup> June). The survey found that concentrations of chlorine were generally low throughout the estuary with slightly higher concentrations in the immediate vicinity of the outfall. It should be noted that an environmental quality standard for chlorine is not specified in the European Communities Environmental Objectives (Surface Waters) Regulations 2009. All VOC (volatile organic carbons) substances (including Trihalomethanes), were below the limits of detection. The licensee also monitors the estuary for trichloromethane under the existing licence, and the results to date have been below the limit of detection. There were no impacts on pH and temperature from the cooling water discharge evident in the chemistry sampling survey.

An ecological survey was undertaken on 30<sup>th</sup> April and 1<sup>st</sup> May 2020. Hypochlorite dosing had been active since 7<sup>th</sup> April 2020. The ecological survey included surveys of subtidal habitats, intertidal habitats and phytoplankton in the vicinity of the discharge. The ecological survey showed that the communities present were consistent with previous National Parks and Wildlife Service surveys. Apart from the immediate area within the vicinity of the discharge point, there was no evidence of an impact on the intertidal or subtidal invertebrate communities or on the phytoplankton community.

The current licence has a chlorine ELV of 0.3 mg/l which is monitored at weekly intervals by means of a grab sample. BAT Reference for Industrial Cooling Systems includes limits for residual oxidant at the outlet of  $\leq 0.2$  mg/l for continuous chlorination (as a 24 hour average) and  $\leq 0.5$  mg/l (hourly average within one day) for intermittent and shock chlorination. The values for continuous dosing are based on having an oxidant concentration of 0.2 to 0.3 mg/l before the cooling condensers. However, the BAT Reference emphasises that any dosing regime will be site specific and dependent on factors such as the persistence of the biocide, type of fouling, water temperature, nutrient status of the cooling water and design of the plant.

Having regard to the assessments of the current discharge on the receiving environment and the efficient operation of the plant, it is recommended that the chlorine limit of 0.3 mg/l be retained for SW2 and the same limit applied at SW8. However, it is recommended to increase the frequency of monitoring from weekly to daily to ensure compliance with the emission limits. Condition 2.2.2.7 of the RD (Schedule of Environmental Objectives and Targets) also requires the licensee to examine practicable options for the reduction of chlorine emissions to water including alternatives to the use of biocide for maintaining the cooling water system.

There has been no change to any relevant environmental quality standards and objectives since the last review of the licence. The limits and controls specified in the previous licence issued (P0606-03) on process emissions to surface waters aimed to achieve the environmental objectives and standards established in the European

Communities Environmental Objectives (Surface Waters) Regulations 2009. As a result, all remaining parameters specified in the current licence limits for this emission have been carried forward in the RD.

### 6.2.2 Other emissions to ground/groundwater

There is an existing septic tank and percolation area at the contractor compound for the treatment of sanitary effluent.

The RD includes a standard condition which requires the licensee to provide and maintain a wastewater treatment plant for the treatment of sanitary effluent and requires the waste water treatment system and percolation area to satisfy the criteria set out in the Wastewater Treatment Manual- Treatment Systems for Small Communities, Business, Leisure Centres and Hotels 1999 published by the EPA.

The licensee has stated that there is existing soil/groundwater contamination. The Baseline Report section of this report provides a summary in relation to soil and groundwater contamination by hazardous substances at the installation.

## 6.3 Storm water discharges

There are four storm water discharges authorised under the current licence: SW1, SW3b, SW4 and SW12. Storm water drains building roofs, hardstanding areas, internal roads and car parks. The storm water drains are fitted with Class I by-pass oil interceptors and silt traps.

The licensee has requested a storm water discharge be included at SW7. This emission point was authorised under the operation of the HFO plant but when the licence was reviewed it wasn't included under operation of the CCGT. SW7 drains an area with decommissioned engine rooms that were part of the HFO plant. This discharge point has now been included in the RD.

The RD requires the licensee to maintain the storm water/drainage system. The RD also requires that the storm water discharge is visually inspected daily and monitored for pH, Suspended Solids (SS) and Total Petroleum Hydrocarbons (TPH), as required by the Agency, in accordance with Schedule C.2.3 *Monitoring of Storm Water Emissions*. Total Petroleum Hydrocarbons are currently monitored at a monthly frequency as agreed by the Agency. Schedule C2.3 has been updated to reflect this.

The RD contains standard conditions in relation to the storage and management of materials and wastes. The RD also requires that accident and emergency response procedures are put in place. The controls pertaining to accidents and emergencies are addressed in the Prevention of Accidents section later in this report.

Due to the proximity of the installation to the receiving water, Condition 3.12 requires the licensee to examine the need to provide automatic diversion of storm water if there is a significant risk of the release of contaminated fire-water into the storm water system.

## 6.4 Noise

As part of the existing licence, a noise monitoring survey is carried out annually at two noise sensitive locations outside the site boundary. Historical data from these surveys indicate that the installation is consistently compliant with licence limits. There has

been one noise complaint since the plant started operating in 2014 – in 2019 a complaint was made in relation to an alarm during a power outage. The issue was resolved at the time.

A noise survey was also carried out as part of the review application at two noise sensitive locations. All monitoring points were determined to comply with the noise limits in the licence. No tonal or impulsive noise was observed at noise sensitive locations.

Noise conditions and emission limit values, which apply at the noise sensitive locations, have been included in the RD. The licensee has requested that an evening noise limit be introduced as per EPA guidance. In accordance with the EPA document Guidance Note for Noise: Licence Applications, Surveys and Assessments in relation to Scheduled Activities (NG4) (2016), the day time ELV has been changed from 55dB LAeq to 55dB LAr, to allow for corrections for tonal noise, and an evening time ELV of 50dB LAr has been introduced.

## **7. Waste generation**

Certain wastes are generated on site as part of the licensable activity. (Waste generated on site mainly comprises scrap metal, fuel oil, diesel, oily water from oil separators, wood, canteen and office waste. Septic tank sludge is currently being tankered off site by an authorised waste contractor. The total quantity generated in 2019 was 1054 tonnes – the majority of which was septic tank sludge.

The licensee employs a number of measures at the installation for the prevention and minimisation of waste. The full list of wastes and waste measures are listed in Attachment 8-1 of the application form.

As evidenced in Attachment 8-1 of the application, and in accordance with the hierarchy specified in the IED, waste generated at the site will, in order of priority, be minimised, be prepared for re-use, recycling, recovery or disposal.

Waste recovery and disposal is controlled by licence conditions which require the waste to be transferred to authorised waste recovery/disposal facilities.

## **8. Energy Efficiency and Resource Use**

The operation of the installation involves the consumption of water, fuel (natural gas, gas oil) and electricity. The estimated annual consumption is given in the table below. Full details of raw materials used in power generation and the treatment of waste gases are in the review application.

<b>Resource</b>	<b>Quantity per annum</b>
Electricity	56,320 MWh
Water (Surface water abstraction)	289 Mm <sup>3</sup> /yr
Water (Public supply)	200,000 m <sup>3</sup> /yr
Natural Gas	477 Mm <sup>3</sup>
Other Fuel Oil	144 m <sup>3</sup>

In the application of BAT, Condition 7 of the licence provides for the efficient use of resources and energy in all site operations. It requires an energy audit to be carried out and repeated at intervals as required by the Agency and the recommendations of

the audit to be incorporated into the Schedule of Environmental Objectives and Targets as outlined in Condition 2 of the licence. The installation operates to an accredited Environmental Management System, ISO 14001.

The combustion system is fitted with an advanced computer-based control system to control combustion efficiency. The installation has a net electrical efficiency of 57.8% when running on natural gas which is towards the upper end of the range of BAT-associated energy efficiency levels (BAT-AEELs) (50-60%) specified for CCGT plants in the CID 2017/1442/EU. Condition 7.5 requires the licensee to test the net electrical efficiency of the combustion unit after each modification that could significantly affect the net electrical efficiency of the unit.

In line with BAT and in order to reduce chlorine emissions in cooling water discharges, Condition 7.4 of the RD requires an efficiency assessment of raw materials used in all processes including biocide (hypochlorite) dosing. Improvements identified through this assessment are to be integrated into the Environmental Management System (EMS).

The estuary is a water resource that is affected by abstraction for cooling water purposes. The abstraction is registered with the EPA (Register No. R00004-01). Water is abstracted for a once through cooling system and the resulting emission is characterised by a thermal load and residual chlorine. The RD specifies limits and controls regarding flow and temperature in cooling water discharges. The regulation of abstraction is outside the scope of the IE licence.

## 9. Prevention of Accidents

A certain amount of accident risk is associated with the licensable activity. The table below specifies the risks and associated safety measures relevant for this installation.

Potential accidents & measures for prevention/limitation of consequences	
Potential for an accident or hazardous/ emergency situation to arise from activities at the installation	Spills/leaks of oil or liquid chemicals during storage, use or delivery. Gas explosion in pipeline. Potential for fire due to quantities of fuel stored and used. Failure of shut off valves that prevent firewater release to estuary.
Preventative/Mitigation measures to reduce the likelihood of accidents and mitigate the effects of the consequences of an accident at the installation	Provision and maintenance of adequate bunding. Bunds are visually inspected weekly and regularly tested for integrity. Labelling - all raw materials, intermediates and waste products are appropriately labelled to ensure they are handled correctly Procedures in place for delivery of gas oil. Delivery overseen by competent and approved personnel. Emergency Response Plan addressing materials handling, spills during deliveries. Loading/unloading of raw materials carried out in designated hardstanding area protected against runoff. Spill kits and adsorbent booms in place to deal with any spills. Storm water fitted with Class 1 oil interceptors. Storm water visually inspected daily.

Potential accidents & measures for prevention/limitation of consequences	
	<p>Emergency response procedure in place with details of emergency alarm signals, fire evacuation procedures.</p> <p>Fire prevention and control systems in place including alarms, firewalls &amp; fire doors, fire hydrants, hose reels, fire extinguishers. The local fire officer has reviewed the installation.</p> <p>Fire water retention on site.</p> <p>All pipes containing environmentally significant materials are located above ground and inspected routinely.</p> <p>Emission stack is fitted with a continuous emissions monitoring system (CEMS).</p>
Additional measures provided for in the RD	<p>Accident prevention and emergency response requirements (Condition 9)</p> <p>ELRA &amp; Financial provision (Condition 12)</p> <p>Firewater retention risk assessment (Condition 3.12)</p>

Condition 9 of the RD requires procedures to be put in place to prevent accidents with a possible impact on the environment and to respond to emergencies so as to minimise the impact on the environment.

The installation is a lower-tier Seveso site for the purposes of the European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 and Amendment Regulations. This is due to the quantity of gas oil stored at the site. The Health and Safety Authority (HSA) is the competent authority responsible for administration and enforcement of these regulations.

In accordance with Agency's Environmental Liabilities guidance<sup>5</sup>, a revised Environmental Liabilities Risk assessment (ELRA) was submitted with the application. (see Fit and Proper Person Assessment section for further details).

## 10. Cessation of Activity

A certain amount of environmental risk is associated with the cessation of any licensable activity (site closure). For this installation the risks relate to the potential for soil, groundwater or surface water contamination.

The licensee has provided a list of measures to be taken in the event of site closure/cessation of activity. These measures are listed in attachment '4320-20-01 SSE Great Island, CRAMP' of the application. Condition 10 of the RD requires the proper closure of the activity with the aim of protecting the environment.

In accordance with Agency Environmental Liabilities guidance, a revised costed Closure, Restoration and Aftercare Management Plan (CRAMP) was submitted with the application. (see Fit and Proper Person Assessment section for further details).

### Baseline Report

Where an activity involves the use, production or release of Relevant Hazardous Substances, and having regard to the possibility of soil and groundwater contamination at the site of the installation, the IED requires operators to prepare a baseline report.

<sup>5</sup> Guidance on Assessing and Costing Environmental Liabilities (EPA 2014)



A baseline report was submitted with the review application (Attachment 4-8 'Baseline Report 220920 01 App'). The report updates the baseline assessment of soil and groundwater submitted under the previous licence review (P0606-03). The report identified soil and groundwater contamination at the site as a result of historical activities associated with the operation of the HFO plant. These include groundwater contamination on the station grounds and in an area of land to the east of the station which had been used for landfilling of waste. Construction waste and general waste were deposited in two cells in this area between the 1960's and the mid 1990's. In 2005, with the agreement of the Agency, these areas were capped and are managed and monitored in compliance with the current licence conditions. This area has been retained within the installation boundary.

The risk to soil/groundwater from the current activity is considered low. The operation of the CCGT does not impact the landfilled area.

Condition 10 of the current licence (P0606-03) requires the licensee to affect the proper closure of the activity to the satisfaction of the Agency by decommissioning, rendering safe or removing for disposal/recovery, buildings, plant or equipment, or any waste, materials or substances that may result in environmental pollution. The licence also requires the licensee to monitor groundwater quality in accordance with Schedule C.5. These conditions have been carried forward in the RD.

## **11. Fit & Proper Person**

### Technical Ability

The licensee has provided details of the qualifications, technical knowledge and experience of key personnel. The licence application also includes information on the on-site management structure. It is considered that the licensee has demonstrated the technical knowledge required.

### Legal Standing

Neither the licensee nor any relevant person has relevant convictions under the Environmental Protection Agency Act 1992, as amended, or under any other relevant environmental legislation.

### ELRA, CRAMP and Financial Provision

The installation was assessed for the requirements of Environmental Liabilities Risk Assessment (ELRA), Closure, Restoration and Aftercare Management Plan (CRAMP) and Financial Provision (FP), in accordance with Agency guidance. Under this assessment it has been determined that ELRA, CRAMP and FP were required.

ELRA and CRAMP were agreed with OEE under the current licence (P0606-03) in 2017. The licensee has financial provision in place under a parent company guarantee: there is no expiry data under this guarantee.

### Fit & Proper Conclusion

It is my view, that the licensee can be deemed a Fit & Proper Person for the purpose of this review.

## **12. Submissions**

While the main points raised in the submissions are briefly summarised in the table below, the original submissions should be referred to at all times for greater detail and expansion of particular points.

The issues raised in the submissions are noted and addressed in this Inspector's Report and the submissions were taken into consideration during the preparation of the Recommended Determination (RD).

<b>Submissions</b>			
<b>1</b>	<b>Name &amp; Position</b>	<b>Organisation:</b>	<b>Date received:</b>
	Miss Kay O Connor A/Senior Environmental Health Officer	HSE, Wexford	05 November 2020
	<p><b>Issues raised:</b> Groundwater contamination, protection of surface water quality, SACs, Shellfish waters.</p> <p><b>Agency response:</b> Groundwater contamination is due to historical activities at the site. In response the RD requires the licensee to demonstrate ongoing compliance with the Environmental Objectives (Groundwater) Regulations 2010 as amended; any actions required shall be implemented within a period agreed by the Agency. The RD also requires annual/biennial groundwater monitoring in accordance with the requirements of the IED.</p> <p>An assessment of the impacts of discharges to receiving waters and protected areas has been carried out as part of the inspector's report. The RD specifies emission limit values (ELVs) and monitoring for process emissions to surface water.</p> <p>Condition 9 of the RD requires procedures to be put in place to prevent accidents with a possible impact on the environment and to respond to emergencies so as to minimise the impact on the environment.</p>		
<b>2</b>	<b>Name &amp; Position</b>	<b>Organisation:</b>	<b>Date received:</b>
	Donnachadh Byrne	IFI	24 February 2021
	<p><b>Issues raised:</b> protection of fish in the channel between the water intake point and discharge back to the estuary at SW8. Specific requests/points raised are as follows:</p> <ul style="list-style-type: none"> <li>• frequency of chlorine sampling at SW8 be increased from weekly to continuous on-site monitoring</li> <li>• a chlorine ELV at SW8 that protects the various age classes of different fish species likely to be encountered in the return channel. IFI asked if the option of transferring the chlorine dosing system from its present location close to the abstraction point, to a different location after the cooling water has passed through the band-screens could be assessed by the licensee.</li> <li>• IFI submit that modifications to the channel which conveys fish back to the estuary are likely to be required as part of a long-term solution to fish impingement</li> </ul>		

	<p><b>Agency response:</b></p> <p>An ELV for chlorine at SW8 has been set in line with BAT. The RD requires daily monitoring of chlorine at SW8.</p> <p>As part of the Environmental Management System, the Schedule of Environmental Objectives and Targets (Condition 2.2.2.7), requires an evaluation of practicable options for moving the point of chlorine dosing downstream of the band-screens, the reduction of fish entrainment and fish impingement as per BAT for industrial cooling systems and the safe passage of fish back to the estuary.</p>		
	<b>Name &amp; Position</b>	<b>Organisation:</b>	<b>Date received:</b>
	Patrick Dwyer and William Dwyer	Stakeholders Involved in oyster farming, harvesting of mussels, cockles and clams in Waterford harbour	12 November 2020
	Paul Barlow	Woodstown Bay Shellfish Ltd.	24 November 2020
	Pat Moran	Stakeholder, Fisherman and Shellfish Grower (Oysters)	12 November 2020 and 20 May 2021
	Eoin Bates	Involved in commercial fishery in Waterford Estuary	29 March 2021
	Stephen Burke	Fisherman	22 March 2021
	Alex Crowley, Secretary NIFO/NIFA	National Inshore Fishermen's Association CLG (NIFA), National Inshore Fishermen's Organisation CLG (NIFO)	21 March 2021
	Liz Goff	South East RIFF - South East Regional Inshore Fisheries Forum	18 April 2021
	Karin Dubsky, Coordinator	Coastwatch	21 April 2021
	Sean Doherty	none specified	18 May 2021
	John Condon, Legal Expert, Marine Habitats and Wildlife, Solicitor (non-practising)	Client Earth	01 June 2021
	Grace O'Sullivan, Member of the European Parliament for Ireland South	Greens/EFA group in the European Parliament - Green Party Ireland	21 September 2021
3	<p><b>Issues raised:</b> Concerns about the effects of the cooling water discharge on marine biota, in particular impacts on shellfish, due to exposure to chlorine, chlorine breakdown products, elevated temperature and pH;</p> <p><b>Agency response:</b> The impacts of emissions on surface water are addressed in Section 6.2.1 of this report. It has been demonstrated that the impact of the chlorine discharge is not significant beyond the immediate vicinity of the cooling water discharge point.</p>		

4	<p><b>Issues raised:</b> Concern about the quantity of sodium hypochlorite usage - a number of submissions submit that the licensee was authorised to use 5 tonnes of sodium hypochlorite in the current licence (based on the previous review application) but are using "in excess of 1,000 tonnes".</p> <p><b>Agency response:</b> The EPA does not restrict the quantity in use at the installation but regulates the emission of chlorine discharged to the estuary by way of emission limits for chlorine concentration and volume flow. In line with BAT and in order to reduce chlorine emissions in cooling water discharges, the RD (Condition 7.4) requires an efficiency assessment of raw materials used in all processes including biocide dosing.</p>
5	<p><b>Issues raised:</b> concern about the current monitoring regime, which allows for self-monitoring of discharges – particularly in relation to "hypochlorite" discharge; and also, whether the licensee has been compliant with the chlorine emission limits in the licence.</p> <p><b>Agency response:</b> no non-compliant emissions have been recorded at the discharge (SW2) during monitoring undertaken by both the Agency and the licensee in the period January 2019 to date. EPA inspectors from the Office of Environmental Enforcement (OEE) visited the site on 23/07/2020 and 10/09/2020 in order to observe discharges of cooling water. During the site visits, chlorine monitoring was undertaken at SW2 and SW8. The results of the monitoring were compliant with the emission limit values in licence P0606-03. We are satisfied that the emission limits are sufficient to prevent significant adverse impacts on the receiving water. The RD increases the frequency of monitoring from weekly to daily to ensure compliance with these limits.</p>
6	<p><b>Issues raised:</b> concern that the assessments submitted as part of the application (ecological survey, estuarine modelling study, chemistry sampling survey) do not adequately assess impacts on water quality, phytoplankton or shellfish. A number of points were raised relating to the spatial extent of the surveys, the need for sampling of chlorine oxidants and breakdown products in the estuary, sampling for seasonal effects on phytoplankton survey and a request for more in-depth analysis of water profile data.</p> <p><b>Agency response:</b> The impacts of emissions on surface water are addressed in Section 6.2.1 of this report. In relation to chlorine sampling and profile of the receiving water body, we are satisfied that the chemistry sampling survey and hydrodynamic modelling adequately describes the impact of discharges on the receiving waterbody.</p>
7	<p><b>Issues raised:</b> that alternatives should be looked at to reduce the impact of the activity on the marine environment.</p> <p><b>Agency response:</b> The issue of alternatives is addressed in the EIS submitted with the application and in Section 15 of this report. Condition 2.2.2.7 of the RD (Schedule of Environmental Objectives and Targets) also requires the licensee to examine practicable options for the reduction of chlorine emissions to water including alternatives to the use of biocide for maintaining the cooling water system as per BAT for industrial cooling systems.</p>
8	<p><b>Issues raised:</b> that Waterford County Council should be consulted given that the estuary is a shared waterbody;</p> <p><b>Agency response:</b> In relation to consultation with Waterford County Council, the Agency is required to notify certain specified public bodies upon receipt of a valid licence application under the relevant legislation. In this case Waterford County Council is not a specified body; however, this does not preclude Waterford County Council from making a submission as a third party.</p>
9	<p><b>Issues raised:</b> that no environmental impact statement (EIS) was submitted with the application – it was submitted that an EIS should be required for this project;</p>

	<p><b>Agency response:</b> An environmental impact statement (EIS) was submitted as part of the application.</p>
10	<p><b>Issues raised:</b> concern about foam caused by the cooling water discharge and its effects on the estuary.</p> <p><b>Agency response:</b> The occurrence of foam in the estuary arising from the cooling water discharge has been the subject of a number of complaints to the Agency since 2016. The issue was investigated on 31 May 2016 and samples were taken for analysis. The samples were typical for estuarine waters and no contamination was identified. It was concluded that the foam was due to mechanical action on the discharged cooling water at the outfall. There is ongoing engagement between the licensee and the EPA (through the Office of Environmental Enforcement) with regard to measures to mitigate the occurrence of foam at the discharge point.</p>
11	<p><b>Issues raised:</b> concern about impacts of the water abstraction on fish including Annex II fish species under the Habitats Directive (salmonids, Twaité shad, lamprey). It was submitted that the abstraction point lacks a fish deterrent system to prevent fish being drawn into the plant and also that light from the plant exposes fish to predation. It was requested that water abstraction cease during fish spawning/migration periods and/or an alternative cooling process be used.</p> <p><b>Agency response:</b> In line with BAT, the Schedule of Environmental Objectives and Targets (Condition 2.2.2) requires an evaluation of practicable options for the reduction of fish entrainment and fish impingement.</p>
12	<p><b>Issues raised:</b> that an assessment needs to be carried out of the discharge from the installation 'in combination' with other activities in the estuary – including dredging works in the Port of Waterford and discharges from waste water treatment plants and other industries.</p> <p><b>Agency response:</b> In relation to 'in combination' effects with dredging or waste water discharges, the installation emissions do not contain significant quantities of sediment or organic matter. In addition, the sampling survey for chlorine, VOC's, pH and temperature provided data on the ambient concentrations (conditions) arising from all activities/discharges in the estuary, not just those from the subject installation and as such are indicative of cumulative impacts on these parameters.</p>
13	<p><b>Issues raised:</b></p> <ul style="list-style-type: none"> <li>• that the installation was not subject to Appropriate Assessment when the current licence was issued in 2011 (P0606-03);</li> <li>• that the installation was screened out for Appropriate Assessment in the current review and the EPA should require the installation be subject to Appropriate Assessment;</li> <li>• that the NIS submitted with the application fails to identify or assess all the aspects of the project likely to have an effect on European sites, adequately take into account cumulative or in-combination effects from other plans or projects including dredging, discharges from water treatment plants and demonstrate beyond reasonable scientific doubt that there will not be significant impacts on the River Barrow and River Nore SAC;</li> <li>• that the EPA as the authority conducting an Appropriate Assessment must 'compile any other evidence including, but not limited to, scientific evidence that is required for the purposes of the Appropriate Assessment' under Regulation 9 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477).</li> </ul>

	<b>Agency response:</b> The activity was screened in for Appropriate Assessment (Appropriate Assessment Screening Determination issued 06 May 2021) and details of the Appropriate Assessment conducted by the inspector are included in Section 14 of this report. A Natura Impact Statement was submitted by the applicant.		
<b>14</b>	<b>Name &amp; Position</b>	<b>Organisation:</b>	<b>Date received:</b>
	Pat Moran (submitted by Peter Guy)	Stakeholder, Fisherman and Shellfish Grower (Oysters)	25 March 2021
	<p><b>Issues raised:</b> This submission expressed disappointment with the lack of response from other regulatory bodies regarding the licence review. In addition, two questions were raised with regard to incidents involving fish at the installation as follows:</p> <ul style="list-style-type: none"> <li>• "Has the EPA been informed by SSE Generation Ireland Ltd Great Island of any incidents in connection with the fish at the Band Screens and fish going into and through the system during Dec 2020 - Jan 2021?"</li> <li>• "Has the EPA been made aware by IFI, Sea Fisheries, Department of Marine and Environment as regards incidents reported to them by SSE Generation Ireland Ltd as regards fish at the Power Plant?"</li> </ul>		
	<p><b>Agency response:</b></p> <ul style="list-style-type: none"> <li>• Under the licensing regulations, the Agency is required to notify certain public bodies upon receipt of a valid licence application. However, the Agency has no power to direct specified bodies to respond to this notice.</li> <li>• The EPA has not been informed by SSE Generation Ireland Ltd Great Island of any incidents in connection with the fish at the Band Screens and fish going into and through the system during Dec 2020 - Jan 2021.</li> <li>• The EPA not been made aware by IFI, Sea Fisheries Protection Authority or the Department of Marine and Environment regarding incidents reported to them by SSE Generation Ireland Ltd regarding fish at the Power Plant.</li> <li>• The EPA are aware that SSE Generation Ireland Ltd (Great Island) have been engaging with Inland Fisheries Ireland (IFI) regarding fish entrainment at the water intake and we understand further techniques are being investigated to minimise fish entrainment. However, it should be noted that fish entrainment at the abstraction point is not a matter that is subject to regulation under the IE licence.</li> </ul>		
<b>15</b>	<b>Name &amp; Position</b>	<b>Organisation:</b>	<b>Date received:</b>
	Trish Smullen Dr Clare Glanville (Senior Geologist)	Geological Survey of Ireland (GSI)	21 September 2021
	<p><b>Issues raised:</b> Response to Specified Body Notification re EIS/EIAR from the Agency. Geological Survey Ireland would encourage use of and reference to their datasets. The submission enclosed a list of our publicly available datasets that may be useful to the environmental assessment and planning process.</p> <p><b>Agency response:</b> No response required by the Agency</p>		

## **13. Consultations**

### **13.1 Cross Office Consultation**

I consulted OEE Inspectors, Billy Shanahan and Brendan Kissane in relation to this site, and OEE Inspector Pat Chan in relation to financial provision. In general, the OEE have no significant concerns regarding the proposed changes to the licence.

The installation was on the OEE National Priority Site List due to the significant interest and complaints regarding the discharges to the estuary.

I consulted with OEA (EPA Office of Evidence and Assessment) Scientific Officer Dr. Robert Wilkes in relation to estuarine modelling.

### **13.2 Transboundary Consultations**

There were no transboundary consultations undertaken as there were no transboundary impacts identified.

## **14. Appropriate Assessment**

Appendix 2 lists the European Sites assessed, their associated qualifying interests and conservation objectives along with the assessment of the effects of the activity on the European Sites River Barrow and River Nore SAC (002162) and Lower River Suir SAC (002137).

A screening for Appropriate Assessment was undertaken to assess, in view of best scientific knowledge and the conservation objectives of the site, if the activity, individually or in combination with other plans or projects is likely to have a significant effect on any European Site. In this context, particular attention was paid to the European Sites at River Barrow and River Nore SAC (002162) and Lower River Suir SAC (002137).

The activity is not directly connected with or necessary to the management of any European Site and the Agency considered, for the reasons set out below, that it cannot be excluded, on the basis of objective information, that the activity, individually or in combination with other plans or projects, will have a significant effect on any European Site and accordingly determined that an Appropriate Assessment of the activity was required, and for this reason determined to require the licensee to submit a Natura Impact Statement. A Natura Impact Statement was received by the Agency on 29 September 2020.

This determination is based on the activity's proximity to European Sites - having particular regard to emissions to surface water, which discharge to a European Site.

An Inspector's Appropriate Assessment has been completed and has determined, based on best scientific knowledge in the field and in accordance with the European Communities (Birds and Natural Habitats) Regulations 2011 as amended, pursuant to Article 6(3) of the Habitats Directive, that the activity, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site, in particular the River Barrow and River Nore SAC (002162) and the Lower River Suir SAC (002137), having regard to their conservation objectives and will not affect the preservation of these sites at favourable conservation status if carried out in accordance with this Recommended Determination and the conditions attached hereto, for the following reasons:

- The licence specifies emission limit values and controls for emissions to air. These emission limit values are supported by air dispersion modelling that has demonstrated that the impact of emissions from the installation will be significantly below relevant air quality standards for the protection of ecosystems. It should also be noted that there will be no change to the nature and quantity of air emissions permitted from the activity as part of this review.
- There will be no increase in permitted noise emissions from the activity. The RD specifies noise emission limit values at noise sensitive locations.
- The licence requires that all storm water discharges, other than from roofs, from the installation pass through a silt trap and oil separator in advance of discharge. The licence also requires the licensee to maintain trigger levels for storm water emissions and a response programme to address exceedances.
- The licence contains standard conditions in relation to the storage and management of materials and wastes.
- Condition 9 of the RD requires the licensee to maintain a documented Accident Prevention Procedure that addresses the hazards on-site, particularly in relation to the prevention of accidents with a possible impact on the environment.
- No significant in-combination effects are predicted; therefore, no additional mitigation measures are required.
- The licence specifies emission limit values for process emissions to surface water. It has been demonstrated that these limits are sufficient to prevent significant effects on the conservation objectives of the relevant European sites.

In light of the foregoing reasons no reasonable scientific doubt remains as to the absence of adverse effects on the integrity of those European Sites at River Barrow and River Nore SAC (002162) and Lower River Suir SAC (002137).

## **15. Environmental Impact Assessment**

### **15.1 EIA Introduction**

As the planning applications requiring EIA were received by the planning authority before 16/05/2017, this assessment is being undertaken in accordance with the requirements of Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. The application was accompanied by an Environmental Impact Statement (EIS) "Proposed Power Plant at Great Island, Co. Wexford Environmental Impact Statement".

As part of this environmental impact assessment, I have carried out an examination, analysis and evaluation of all the information provided by the licensee (including the EIS), the existing licence, Register Number: P0606-03, information received through consultation, the documents associated with the assessments carried out by ABP, and the issues that interact with the matters that were considered by that authority and which relate to the activity, written submissions, as well as considering any relevant supplementary information. All of the documentation received was examined and I consider that the EIS complies with the provisions of Article 5 of the 2011 EIA Directive when considered in conjunction with the additional material submitted with the application. I am satisfied that the environmental effects arising as a consequence of the activity have been satisfactorily identified, described and assessed.

Having specific regard to EIA, this Inspector's report as a whole is intended to identify, describe and assess for the Agency the likely significant direct and indirect effects of



the activity on the environment, as respects the matters that come within the functions of the Agency, for each of the following environmental factors: human beings, fauna and flora, soil, water, air, climate and the landscape, material assets and the cultural heritage.

This Inspector's report addresses the interaction between those effects and the related development forming part of the wider project. The cumulative effects, with other developments in the vicinity of the activity have also been considered, as regards the combined effects of emissions. In addition, the vulnerability of the activity to risks of major accidents and/or disasters has been considered. The mitigation measures proposed to address the range of predicted significant effects arising from the activity have been outlined. This Inspector's report provides conclusions to the Agency in relation to such effects.

A summary of the submissions made by third parties has been set out above in the Submissions Section of this report.

I am satisfied that the public have been given early and effective opportunity to participate in the environmental decision-making process.

## **15.2 Consultation with Planning Authorities in relation to EIA**

Consultation was carried out between An Bord Pleanála and the Agency under the relevant section of the EPA Act 1992, as amended. An Bord Pleanála did not provide any observations to the Agency on the licence application and EIS.

## **15.3 Alternatives**

Alternatives which were considered with regard to the plant were the technologies used, fuel types and a 'do-nothing' scenario. Alternatives to the CCGT plant technology include open cycle turbine, CCGT with air cooled condenser, conversion of existing units and large-scale combined heat and power plant (CHP). Open cycle turbines offer greater flexibility but have higher generating costs, lower efficiency and are more suited for intermittent operation e.g. as peaking plant. Air cooling was rejected for a number of reasons including the size of the structure required, the large noise generated—and the lower efficiency rating in comparison to a once through cooling water system. CHP technology was not appropriate as there are no complementary industrial or district heating loads in the area that would consume the heat output. Solid fuels and gas oil were not considered appropriate on environmental, operational and economic grounds.

The EIS notes that the legal agreement regarding the sale of the ESB site stipulated that it could only be used for the purposes of electricity generation. Thus, it is unlikely that a 'do nothing' scenario would arise where electricity generation would cease at the location.

In this regard I consider that the matter of the examination of alternatives has been satisfactorily addressed.

## **15.4 Likely Significant Direct and Indirect Effects**

The likely significant direct and indirect effects of the activity on the following factors as set out in Article 3 of the EIA Directive are considered in this section:

- (a) *human beings, fauna and flora;*
- (b) *soil, water, air, climate and landscape;*

- (c) *material assets, cultural heritage;*
- (d) *the interaction between the factors referred to in points (a), (b) and (c).*

#### 15.4.1 **Human Beings**

##### **Identification, Description and Assessment of Effects**

Human beings are addressed in Chapters 8, 9 and 11 of the EIS. The potential direct and indirect effects on human beings are associated with emissions to air, noise and emissions to water. Should emissions exceed environmental quality standards this could have implications for human beings. The effects identified and described above have been assessed in Section 6 of this report.

Accidental emissions to air, water or ground could occur in the event of fuel spills/leaks, fire, explosion causing air pollution, soil, groundwater or surface water contamination. This is addressed in Prevention of Accidents section of this report.

Cumulative effects in relation to human beings have been assessed and it is considered that there is not likely to be a significant cumulative effect from the activity and other activities/developments. There are no likely significant direct, indirect or cumulative effects identified.

##### **Mitigation and Monitoring**

Mitigation measures and monitoring in relation to human beings are detailed in the following sections of this report: Emissions to Air, Emissions to Water/ Ground, Noise, Waste Generation, Prevention of Accidents.

##### **Conclusions**

I have examined all the information on human beings, provided by the licensee, received through consultations, written submissions, as well as considering any relevant supplementary information I am satisfied that the potential effects identified will be avoided, managed and mitigated by the measures identified and through the proposed conditions of the Recommended Determination. I am, therefore, satisfied that the operation of the activity is not likely to have any unacceptable direct or indirect effects in terms of human beings.

#### 15.4.2 **Fauna and Flora**

##### **Identification, Description and Assessment of Effects**

Flora and Fauna is addressed in Chapter 12 of the EIS. The EIS describes the habitats and species at and in the vicinity of the installation. The development site is brownfield and located within the confines of the existing operational power plant site.

A terrestrial habitat and botanical survey of the site was carried out as well as surveys for protected mammals including badgers, bat and otters. Habitats present within the site included Re-colonising Bare Ground, Building and Artificial Surfaces, Immature Woodland and Mixed Broadleaved/Conifer Woodland. No rare or protected habitats or flora were identified during the survey. No bat roosts, badger setts or otter were identified within the site. Overall, the proposed site and parking bay were evaluated as being of local importance (lower value). The licensee also submitted a Natura Impact Statement, (see the Appropriate Assessment section of this report).

The potential direct and indirect effects on fauna and flora are related to effects on aquatic flora and fauna and their habitats due to effects on water quality, disturbance to fauna due to noise emissions, and effects due to air emissions. The effects identified

and described above have been assessed in the following sections of this report: Emissions to Water/Ground, Emissions to Air.

There is also the potential for accidental emissions to the environment, as described in Section 9 due to e.g. fire or spills/leaks. This is addressed in the Prevention of Accidents section of this report.

Cumulative effects in relation to flora and fauna have been assessed and it is considered that there is not likely to be a significant cumulative effect from the activity and other activities/developments. There are no likely significant direct, indirect or cumulative effects identified.

### **Mitigation and Monitoring**

Mitigation measures and monitoring in relation to fauna and flora are detailed in the following sections of this report: Emissions to Air, Emissions to Water, Noise, Prevention of Accidents.

### **Conclusions**

I have examined all the information on fauna and flora, provided by the licensee, received through consultations, written submissions, as well as considering any relevant supplementary information relevant supplementary information. I am satisfied that the potential effects identified will be avoided, managed and mitigated by the measures identified and through the proposed conditions of the Recommended Determination. I am, therefore, satisfied that the operation of the activity is not likely to have any unacceptable direct or indirect effects in terms of fauna and flora.

#### **15.4.3 Soil (including geology, emissions to ground and groundwater)**

##### **Identification, Description and Assessment of Effects**

Soil is addressed in Chapter 13 of the EIS.

The site lies within the confines of a decommissioned heavy fuel oil (HFO) power plant station, formerly operated by the ESB. The station was constructed in the 1960s on agricultural land and land reclaimed from the estuary during development of the site. The CCGT is located next to the old HFO (heavy fuel oil) plant building. The power plant site is located on the Co. Wexford coastline at the confluence of the River Suir and River Barrow. The surrounding area is characterised by agricultural lands.

A baseline assessment of soil and groundwater condition was submitted as part of the EIS. Soil, sediment, surface water and groundwater were sampled in the station grounds and former landfill areas as part of an environmental site assessment in 2009. Baseline soils identified included fine-grained sandy and silty topsoil, loose brown clay, stiff silty sandy clays with boulders and made ground consisting mainly of gravel.

The potential direct and indirect effects on soil are associated with spills or leaks of fluids used on site which could impact soil and groundwater quality. The effects identified and described above have been assessed in the following section of this report: Emissions to Water/Ground, Prevention of Accidents, Cessation of Activity.

Cumulative effects in relation to soil have been assessed and it is considered that there is not likely to be a significant cumulative effect from the activity and other activities/developments. There are no likely significant direct, indirect or cumulative effects identified.

## **Mitigation and Monitoring**

Mitigation measures and monitoring in relation to soil are detailed in the following sections of this report: Emissions to Water/ Ground, Waste, Prevention of Accidents, Cessation of Activity (Baseline Report).

## **Conclusion**

I have examined all the information on soil provided by the licensee, received through consultations, and in written submissions, as well as considering any relevant supplementary information. I am satisfied that the potential effects identified will be avoided, managed and mitigated by the measures identified and through the proposed conditions of the Recommended Determination. I am, therefore, satisfied that the operation of the activity is not likely to have any unacceptable direct or indirect effects on soil.

### **15.4.4 Water (including Waste Water, Storm Water, Emissions to Ground)**

#### **Identification, Description and Assessment of Effects**

Water is addressed in Chapters 13 and 14 of the EIS.

The potential direct and indirect effects on water relate to e.g. process emissions to surface water, storm water emissions. Should the emissions cause an exceedance of Water Quality Standards in the receiving water, this could have potential effects on water quality, aquatic biodiversity and human health. The effects identified and described above have been assessed in the following section of this report: Emissions to Water/Ground, Storm Water Discharges, Energy Efficiency and Resource Use.

Accidental discharges of contaminated storm water or other substances to ground may directly and indirectly affect ground water quality, surface water quality and aquatic flora and fauna. However, the likelihood of accidental emissions to water is considered low in light of the measures outlined in the "Prevention of Accidents" section and in light of the conditions in the RD.

Cumulative effects in relation to water have been assessed and it is considered that there is not likely to be a significant cumulative effect from the activity and other activities/developments. There are no likely significant direct, indirect or cumulative effects identified.

## **Mitigation and Monitoring**

Mitigation measures and monitoring in relation to water are detailed in the following sections of this report: Emissions to Water/Ground, Waste Generation, Prevention of Accidents, Baseline Report, Energy Efficiency and Resource Use.

## **Conclusions**

I have examined all the information on water (including Waste Water, Storm Water, Emissions to Ground) provided by the licensee, received through consultations, and in written submissions, as well as considering any relevant supplementary information. I am satisfied that the potential effects identified will be avoided, managed and mitigated by the measures identified and through the proposed conditions of the Recommended Determination. I am, therefore, satisfied that the operation of the activity is not likely to have any unacceptable direct or indirect effects on water.

#### 15.4.5 **Noise and Vibration**

##### **Identification, Description and Assessment of Effects**

Noise and vibration are addressed in Chapter 11 of the EIS.

The plant is located in an area made up predominately of agricultural land with a number of scattered residential properties. Cheekpoint, to the south of the site on the opposite side of the river, is the closest settlement (~700m). Noise arising from the installation could have the potential to cause nuisance for those living near the activity or to affect noise sensitive species. The effects have been assessed in the noise section of this report.

The power station is not a source of operational vibration which could give rise to nuisance or damage to properties.

There is also the potential for accidental noise emissions due to e.g. explosion. This is addressed in Prevention of Accidents section of this report. There are no likely significant direct, indirect or cumulative effects identified.

##### **Mitigation and Monitoring**

Mitigation measures and monitoring in relation to noise are detailed in the following section of this report: Section 6.4 Noise.

##### **Conclusions**

I have examined all the information on noise provided by the licensee, received through consultations and in written submissions, as well as considering any relevant supplementary information. I am satisfied that the potential effects identified will be avoided, managed and mitigated by the measures identified and through the proposed conditions of the Recommended Determination. I am, therefore, satisfied that the operation of the activity is not likely to have any unacceptable direct or indirect effects in terms of noise.

#### 15.4.6 **Air**

##### **Identification, Description and Assessment of Effects**

Air is addressed in Chapter 15 of the EIS.

The potential direct and indirect effects on air, including dust and exhaust gases are associated with emissions from the CCGT. Should emissions exceed Air Quality Standards this could have implications for air quality, human beings and fauna and flora. The effects identified and described above have been assessed in the following section of this report: Emissions to Air.

There is also the potential for accidental emissions to the environment, due to e.g. fire, or explosion. This is addressed in the Prevention of Accidents section of this report.

Cumulative effects in relation to air have been assessed and it is considered that there is not likely to be a significant cumulative effect from the activity and other activities/developments.

There are no likely significant direct, indirect or cumulative effects identified.

##### **Mitigation and Monitoring**

Mitigation measures and monitoring in relation to air are detailed in the following sections of this report: Emissions to Air.

## **Conclusions**

I have examined all the information on Air provided by the licensee, received through consultations, and in written submissions, as well as considering any relevant supplementary information. I am satisfied that the potential effects identified will be avoided, managed and mitigated by the measures identified and through the proposed conditions of the Recommended Determination. I am, therefore, satisfied that the operation of the activity is not likely to have any unacceptable direct or indirect effects in terms of Air.

### **15.4.7 Climate**

#### **Identification, Description and Assessment of Effects**

Chapter 15 of the EIS addresses Climate. Climate change is a significant global issue which affects weather and environmental conditions (air, water and soil) which consequently affects population and human health, material assets, cultural heritage, the landscape and fauna and flora. Climate change is caused by warming of the climate system by enhanced levels of atmospheric greenhouse gases (GHG) due to human activities. GHG's are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), nitrogen trifluoride (NF<sub>3</sub>) and sulphur hexafluoride (SF<sub>6</sub>).

The direct and indirect effects on climate are mainly from emissions from the combustion of natural gas in the plant. It is noted that the CCGT is considerably more energy efficient than the oil-fired power station it replaced.

The installation operates under a Greenhouse Gas (GHG) Emissions permit in accordance with the European Communities (Greenhouse Gas Emissions Trading) Regulations 2012, (S.I. No. 490 of 2012 and amendments). The GHG permit does not cover emissions of gases other than carbon dioxide. The GHG permit does not set a limit on the quantity of CO<sub>2</sub> emitted by the installation. The operator must report each year all CO<sub>2</sub> emitted from the activity listed in the permit and surrender sufficient emissions trading allowances to cover the emissions of the previous calendar year. The quantity of allowances made available on the market or by free allocation is controlled at EU level and is reducing each year in order to ensure that overall emissions from the ETS sector meet the EU targets. As discussed above since this site is part of the EU ETS the impacts of carbon dioxide emissions are addressed in that market-based scheme. A local impact on air quality from CO<sub>2</sub> is not expected and there is therefore no CO<sub>2</sub> limit in the Recommended Determination.

In relation to cumulative effects, any combustion process will inevitably produce quantities of gases, including greenhouse gases (GHG), which have the potential to impact on climate. However, any discussion of GHG emissions must be extended to national and global climate impact.

Given that this installation is subject to the EU ETS I consider that the impact of direct and indirect CO<sub>2</sub> emissions from the installation are controlled under that legislation.

It is considered that the likelihood of accidental emissions occurring which could affect climate is low in light of the measures outlined in the "Prevention of Accidents" section above and the proposed conditions in the RD.

#### **Mitigation and Monitoring**

Mitigation measures and monitoring in relation to climate are detailed in the following sections of the licence assessment part of this report: Emissions to Air, Prevention of Accidents, Energy Efficiency and Resource Use.

## **Conclusions**

I have examined all the information on climatic factors provided by the licensee, received through consultations, and in written submissions, as well as considering any relevant supplementary information. I am satisfied that the potential effects identified will be avoided, managed and mitigated by the measures identified and through the proposed conditions of the Recommended Determination. I am, therefore, satisfied that the operation of the activity is not likely to have any unacceptable effects.

### **15.4.8 Material Assets, Cultural Heritage and the Landscape**

#### **15.4.8.1 Material Assets**

##### **Identification, Description and Assessment of Effects**

The potential direct and indirect effects on material assets are the use of natural resources. The activity will require the consumption of certain material assets; in particular natural gas and water. The amounts used are listed in Section 8. The activity will lead to the generation of a certain amount of waste materials. These are specified and assessed in Section 7 of the report.

No significant cumulative effects on material assets have been identified.

Material assets such as roads and traffic and built services are dealt with in the decision of An Bord Pleanála to grant permission for the development and are not controlled by the Agency. The Planning Authority has considered the effect to be acceptable. Therefore, there are no likely significant direct, indirect or cumulative effects identified.

##### **Mitigation and Monitoring**

Mitigation measures and monitoring in relation to material assets are detailed in the following sections of the licence assessment part of this report: Waste Generation, Energy Efficiency and Resource Use, Prevention of Accidents.

##### **Material Assets Conclusions**

I have examined all the information on Material Assets provided by the licensee, received through consultations, and in written submissions, as well as considering any relevant supplementary information. I am satisfied that the potential effects identified will be avoided, managed and mitigated by the measures identified and through the proposed conditions of the Recommended Determination. I am, therefore, satisfied that the operation of the activity is not likely to have any unacceptable direct or indirect effects in terms of Material Assets.

An Bord Pleanála has also identified, described and assessed the likely significant direct and indirect effects of the development on material assets and has considered the effect to be acceptable subject to conditions.

#### **15.4.8.2 Cultural Heritage**

##### **Identification, Description and Assessment of Effects**

No items of archaeological, architectural or cultural heritage value were found to exist within the application site. However, the site is located within an archaeologically rich landscape. The potential direct and indirect effects on cultural heritage include damage

to archaeological remains or features. These matters are dealt with in the decision of the planning authority to grant planning permission for the developments on site and are not controlled by the Agency. The planning authority has considered the effect to be acceptable.

It is very difficult to envisage any pathway by which emissions from the operation of the activity could impact any feature which might be present. No significant cumulative effects on the cultural heritage have been identified. Therefore, there are no likely significant direct, indirect or cumulative effects identified.

### **Mitigation and Monitoring**

There are no specific mitigation measures or monitoring proposed in the RD.

### **Cultural Heritage Conclusions**

An Bord Pleanála has identified, described and assessed the likely significant direct and indirect effects of the development on cultural heritage and have decided the proposal is acceptable subject to conditions. The Recommended Determination does not propose to include any additional mitigation measures in relation to material assets and cultural heritage.

#### 15.4.8.3 The Landscape

### **Identification, Description and Assessment of Effects**

Chapter 16 of the EIS addresses Landscape.

The potential direct and indirect effects on the landscape are visual impact. Any disturbance of the landscape has the potential to impact on human beings and their enjoyment of the surrounding area due to visual impacts. These matters are dealt with in the decision of the planning authority to grant planning permission for the developments on site and are not controlled by the Agency. The planning authority has considered the effects to be acceptable subject to conditions.

The installation is located in an established brownfield site and has the potential to present a less cluttered profile when viewed from the opposite shore, than the old HFO power station.

### **Mitigation and Monitoring**

There are no specific mitigation measures or monitoring proposed in the RD.

### **The Landscape Conclusions**

An Bord Pleanála has identified, described and assessed the likely significant direct and indirect effects of the development on the landscape. The Recommended Determination does not propose to include any additional mitigation measures in relation to landscape and visual impact.

### **Overall Conclusions for Material Assets, Cultural Heritage and the Landscape**

I have examined all the information on material assets, cultural heritage and the landscape provided by the licensee, received through consultations, and in written submissions, as well as considering any relevant supplementary information. I am satisfied that the potential effects identified will be avoided, managed and mitigated by the measures identified. I am, therefore, satisfied that the operation of the activity is not likely to have any unacceptable direct or indirect effects in terms of Landscape.



#### 15.4.9 Interactions Between Environmental Factors

Interactions of effects are considered in Section 18 of the EIS. The interactions between factors arising from the activity are set out in the matrix provided as Table 18.1 of the EIS.

The interrelationship between human beings and water, air, noise/vibration, landscape and traffic are discussed in Chapters 8 to 18 of the EIS. The interactions between factors are also discussed throughout this report. The most significant interactions between the factors as a result of the activity are summarised below:

##### Air, Climate and Flora and Fauna

Air emissions in excess of the emissions permitted in the RD have the potential to effect Fauna and Flora (In particular, elevated NO<sub>x</sub> and SO<sub>x</sub> which may affect vegetation.) Emissions which exceed the limits will also further contribute to the cumulative impact on climate. As demonstrated above, such effects are considered not to be likely or significant.

##### Water, Soil and Flora and Fauna, Human beings

Emissions to surface water in excess of emissions permitted in the RD, and accidental discharges of contaminated water could directly and indirectly effect soil, ground water quality, surface water quality, aquatic ecosystems and associated socioeconomic benefits. As demonstrated above, such effects are considered not to be likely given the safeguards in the RD or significant.

#### **Conclusions**

I have considered the interaction between human beings, fauna and flora, soil, water, air, climate, landscape, material assets, cultural heritage and the interaction of the likely effects identified throughout this report. I am satisfied that the potential effects identified will be avoided, managed and mitigated by the measures identified and through the proposed conditions of the Recommended Determination. I am, therefore, satisfied that the operation of the activity is not likely to have any unacceptable effects in terms of the interaction between the foregoing environmental factors.

### **15.5 Reasoned Conclusion on the significant effects**

Having regard to the examination of environmental information contained above, and in particular to the content of the EIS and supplementary information provided by the licensee, and third parties in the course of the application, it is considered that the potential significant direct and indirect effects of the activity on the environment are as follows:

- Emissions to air;
- Process emissions to surface water;
- Storm water emissions to water;
- Accidental leakages or spillages.

Having assessed those potential effects, I have concluded as follows:

- Emissions to air will be mitigated through: imposing emission limit values to ensure compliance with ambient air quality standards and BAT and implementing monitoring and control measures specified in the RD.

- Process water discharges to the estuary will be mitigated through imposing emission limit values to ensure compliance with environmental quality standards and BAT.
- Storm water discharges will be mitigated through the requirement for daily visual inspection of storm water drains, Class I oil interceptors and silt traps.
- Accidental leakages or spillages of contaminants to ground or groundwater, will be mitigated through: integrity testing of pipes, tanks and bunds, requirement for compliance with environmental quality standards for groundwater and implementation of monitoring, maintenance and control measures.

Having regard to the effects (and interactions) identified, described and assessed throughout this report, I consider that the monitoring, mitigation and preventative measures proposed will enable the activity to operate without causing environmental pollution, subject to compliance with the Recommended Determination. The conditions of the RD and the mitigation measures proposed will significantly reduce the likelihood of accidental emissions occurring and limit the environmental consequences of an accidental emission should one occur.

## **16. EPA Charges**

The annual enforcement charge recommended in the RD is €15,933, which reflects the anticipated enforcement effort required and the cost of monitoring.

## **17. Recommendation**

The Agency, in considering an application for a licence or the review of a licence, shall have regard to Section 83 of the EPA Act 1992 as amended.

The Agency shall not grant a licence or revised licence unless it is satisfied that emissions comply with relevant emission limit values and standards prescribed under regulation.

In setting such limits and standards, the Agency must ensure they are established based on the stricter of both the limits and controls required under BAT, and those required to comply with any relevant environmental quality standard.

The RD specifies the necessary measures to provide that the installation shall be operated in accordance with the requirements of Section 83(5) of the EPA Act 1992, as amended and has regard to the AA and EIA. The RD gives effect to the requirements of the Environmental Protection Agency Act 1992, as amended and has regard to submissions made.

I recommend that a Proposed Determination be issued subject to the conditions and for the reasons as drafted in the RD.

Signed

  
 \_\_\_\_\_  
 Jim Johnson

## **Procedural Note**

In the event that no objections are received to the Proposed Determination on the application, a licence will be granted in accordance with Section 87(4) of the

Environmental Protection Agency Act 1992, as amended as soon as may be after the expiration of the appropriate period.

## Appendices

### Appendix 1 Site Location

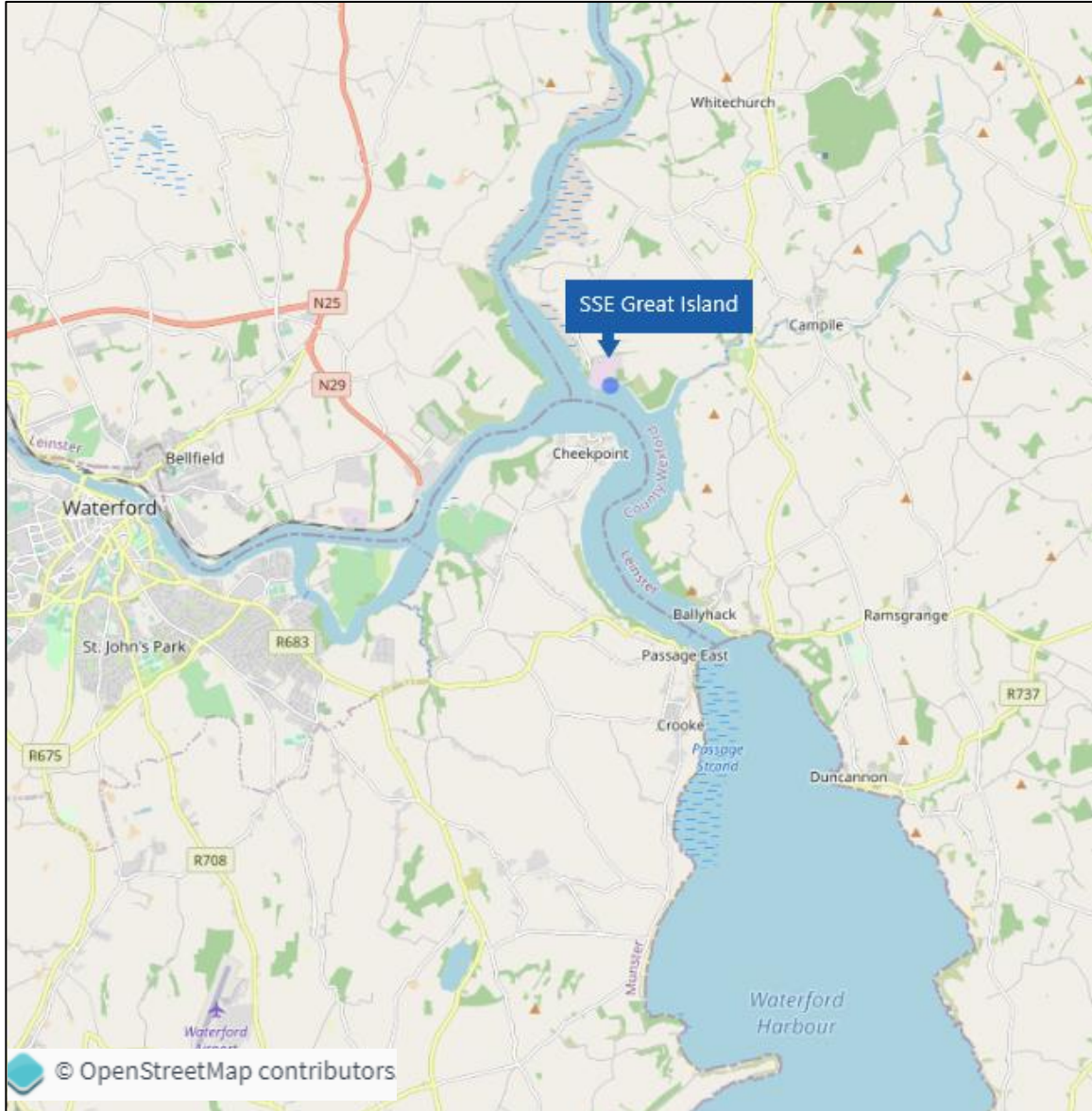


Figure 1 Installation location



Figure 2 Process water emissions from the installation

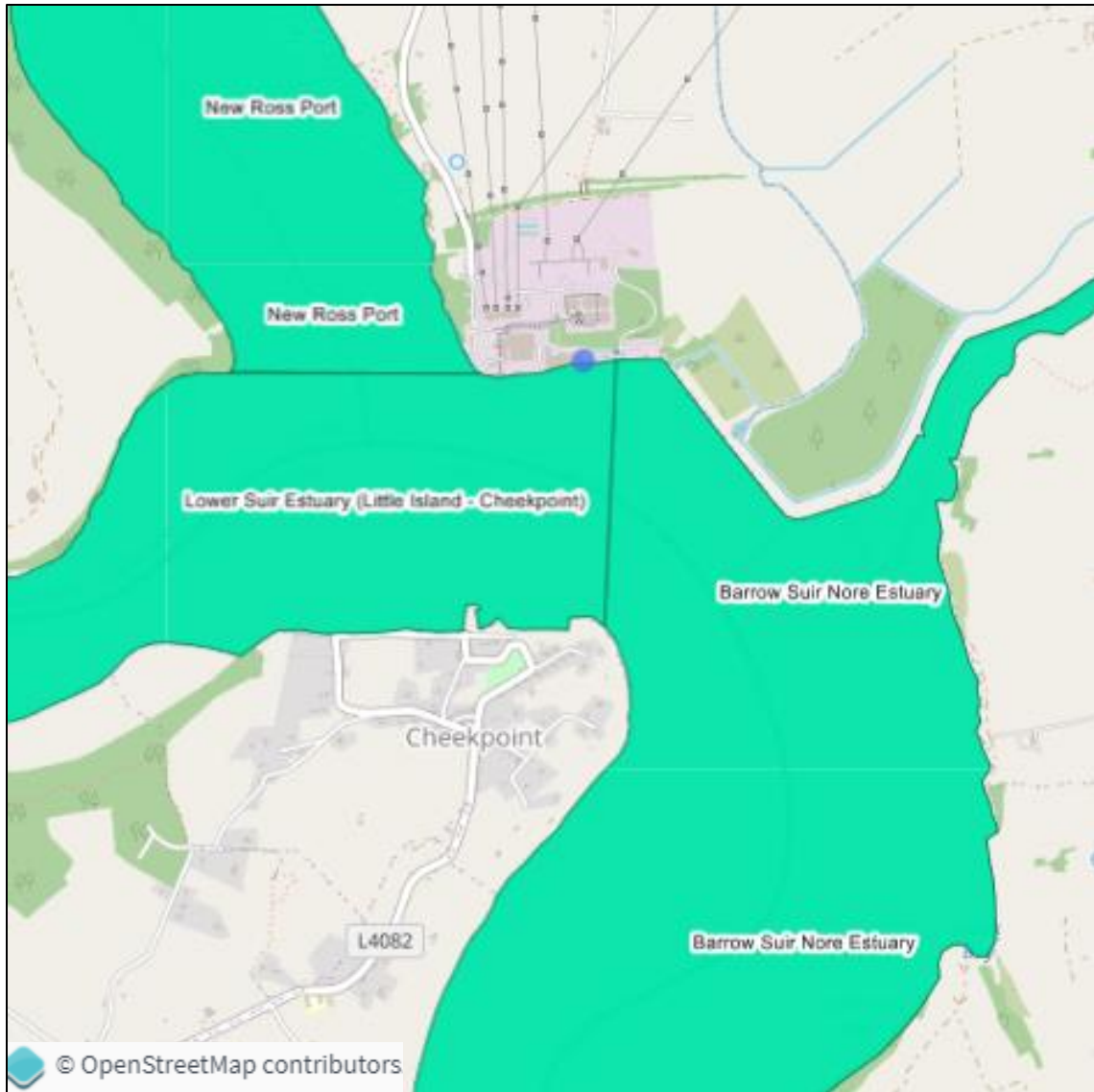


Figure 3 Installation location and Water Framework Directive (WFD) waterbodies.



## Appendix 2 Appropriate Assessment

Assessment of the effects of the activity on European sites and proposed mitigation measures.

<b>Site Name (Code)</b>	River Barrow and River Nore SAC (002162)
<b>Conservation Objectives</b>	NPWS (2011) Conservation Objectives: River Barrow and River Nore SAC 002162. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
<b>Qualifying Interests (* denotes a priority habitat)</b>	<b>Assessment</b>
<p><b>Habitats</b>  1130 Estuaries  1140 Mudflats and sandflats not covered by seawater at low tide  1170 Reefs  1310 Salicornia and other annuals colonising mud and sand  1330 Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>)  1410 Mediterranean salt meadows (<i>Juncetalia maritimi</i>)  3260 Water courses of plain to montane levels with the <i>Ranuncion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation  4030 European dry heaths  6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels  7220 Petrifying springs with tufa formation (<i>Cratoneurion</i>)*  91A0 Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles  91E0 Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>)*</p> <p><b>Species</b>  1029 Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>)  1016 Desmoulin's Whorl Snail (<i>Vertigo moulinsiana</i>)  1355 Otter (<i>Lutra lutra</i>)  1092 White-clawed Crayfish (<i>Austropotamobius pallipes</i>)  1106 Salmon (<i>Salmo salar</i>)  1421 Killarney Fern (<i>Trichomanes speciosum</i>)  1103 Twaite Shad (<i>Alosa fallax fallax</i>)  1990 Nore Pearl Mussel (<i>Margaritifera durrovensis</i>)  1095 Sea Lamprey (<i>Petromyzon marinus</i>)  1096 Brook Lamprey (<i>Lampetra planeri</i>)  1099 River Lamprey (<i>Lampetra fluviatilis</i>)</p>	<p><u>Emissions to Water</u>  Discharges to the SAC include cooling water, screen wash water, process emissions and treated wastewater as well as storm water. These are addressed in Section 6.2 and 6.3 of this report.  There is the potential for impacts on water quality upon which qualifying interests depend.  <b>Mitigation</b></p> <ul style="list-style-type: none"> <li>• Emissions may be made from specified emission points set out in <i>Schedule B: Emission Limits</i>, subject to compliance with the Emission Limit Values specified in that Schedule. Limits have been set to achieve the environmental objectives of the European Communities Environmental Objectives (Surface Waters) Regulations 2009 including protected area objectives for conservation areas.</li> <li>• Condition 3 of the RD requires that all tank, container and drum storage areas shall be rendered impervious to the materials stored therein.</li> <li>• The RD requires the licensee to establish trigger levels for storm water discharges.</li> <li>• The RD requires the licensee to properly maintain the storm water drainage system.</li> </ul> <p><u>Emissions to Air</u>  Emissions to air are described in Section 6.1 of this report. The installation has channelled emissions to air.  The main potential for impact would arise from changes in air quality which could affect the habitats and species directly or could affect the prey on which the qualifying species depend.  <b>Mitigation</b></p> <ul style="list-style-type: none"> <li>• Air dispersion modelling demonstrates that the impact of emissions from the installation will be significantly below the relevant air quality standards and standards for protection of ecosystems and vegetation.</li> <li>• Condition 5 states that emissions may be made from the specified emission points set out in Schedule B subject to compliance with the Emission Limit Values specified</li> </ul>

in that Schedule. Schedule C of the RD also sets out the control requirements for emissions to air.

Noise

Noise could give rise to disturbance of qualifying interests. Noise emissions are described in section 6.4 of this report.

*Mitigation*

The RD requires the licensee to comply with emission limits for noise and to carry out an annual noise survey.

Potential Risk to Groundwater

Qualifying interests in the SAC are dependent on water quality including. Potential impacts on groundwater could impact associated surface waters.

*Mitigation*

- Condition 6 of the RD requires a review the most relevant hydrogeological assessment report for the installation to demonstrate compliance with the European Communities Environmental Objectives (Groundwater) Regulations
- The RD requires monitoring of soil and groundwater for relevant hazardous substances on a risk-based assessment.
- Condition 6 of the RD requires that the integrity and water tightness of all underground pipes, tanks, bunding structures and containers and their resistance to penetration by water or other materials carried or stored therein shall be tested and demonstrated by the licensee.

Potential for Accidents

There is a potential for accident and emergency situations arising from the operations at the installation. Such accident and emergency situations could have implications for the qualifying interests of the SAC.

*Mitigation*

The RD requires that the following controls are in place to protect the qualifying interests of the SAC:

- Condition 3 of the RD states that all pumps, sumps and storage tanks from which spillage of environmentally significant materials might occur in such quantities as



	<p>are likely to breach local or remote containment or separators, shall be fitted with high liquid level alarms</p> <ul style="list-style-type: none"> <li>• Condition 8 of the RD requires that all material and waste shall be loaded, unloaded and stored in designated areas protected as may be appropriate against spillage and leachate run-off.</li> <li>• Condition 9 of the RD requires the licensee, to ensure that a documented Accident Prevention Procedure is in place that addresses that hazards on-site, particularly in relation to the prevention of accidents with a possible impact on the environment.</li> <li>• Condition 9 of the RD requires the licensee to have a documented Emergency Response Procedure in place that addresses any emergency situation on-site which should include provision for minimising the effects of any emergency on the environment.</li> <li>• Condition 12 of the RD requires the licensee to revise an Environmental Liabilities Risk Assessment (ELRA) to assess the risks of accidents/incidents every three years.</li> </ul>
--	---

<b>Site Name (Code)</b>	Lower River Suir SAC (002137)
<b>Conservation Objectives</b>	NPWS (2017) Conservation Objectives: Lower River Suir SAC 002137. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs
<b>Qualifying Interests (* denotes a priority habitat)</b>	<b>Assessment</b>
<p><b>Habitats</b>  1330 Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)  1410 Mediterranean salt meadows (<i>Juncetalia maritimi</i>)  3260 Water courses of plain to montane levels with the <i>Ranuncion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation  6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels  91A0 Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles  91E0 Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i></p>	<p><u>Emissions to Water</u>  Discharges to the SAC include cooling water, screen wash water, process emissions and treated wastewater as well as storm water. These are addressed in Section 6.2 and 6.3 of this report.  There is the potential for impacts on water quality upon which qualifying interests depend.</p> <p><i>Mitigation</i></p> <ul style="list-style-type: none"> <li>• Emissions may be made from specified emission points set out in <i>Schedule B: Emission Limits</i>, subject to compliance with the Emission Limit Values specified in that Schedule. Limits have been set to achieve the environmental objectives of the</li> </ul>

(Alno-Padion, Alnion incanae, Salicion albae)\*  
91J0 Taxus baccata woods of the British Isles\*

**Species**

1092 White-clawed Crayfish (*Austropotamobius pallipes*)  
1029 Freshwater Pearl Mussel (*Margaritifera margaritifera*)  
1099 River Lamprey (*Lampetra fluviatilis*)  
1096 Brook Lamprey (*Lampetra planeri*)  
1355 Otter (*Lutra lutra*)  
1095 Sea Lamprey (*Petromyzon marinus*)  
1103 Twaite Shad (*Alosa fallax fallax*)  
1106 Salmon (*Salmo salar*)

European Communities Environmental Objectives (Surface Waters) Regulations 2009 including protected area objectives for conservation areas.

- Condition 3 of the RD requires that all tank, container and drum storage areas shall be rendered impervious to the materials stored therein.
- The RD requires the licensee to establish trigger levels for storm water discharges.
- The RD requires the licensee to properly maintain the storm water drainage system.

Emissions to Air

Emissions to air are described in Section 6.1 of this report. The installation has channelled emissions to air.

The main potential for impact would arise from changes in air quality which could affect the habitats and species directly or could affect the prey on which the qualifying species depend.

*Mitigation*

- Air dispersion modelling demonstrates that the impact of emissions from the installation will be significantly below the relevant air quality standards and standards for protection of ecosystems and vegetation.
- Condition 5 states that emissions may be made from the specified emission points set out in Schedule B subject to compliance with the Emission Limit Values specified in that Schedule. Schedule C of the RD also sets out the control requirements for emissions to air.

Noise

Noise could give rise to disturbance of qualifying interests. Noise emissions are described in section 6.4 of this report.

*Mitigation*

The RD requires the licensee to comply with emission limits for noise and to carry out an annual noise survey.

Potential Risk to Groundwater

Qualifying interests in the SAC are dependent on water quality including. Potential impacts on groundwater could impact associated surface waters.

*Mitigation*

- Condition 6 of the RD requires a review the most relevant hydrogeological assessment report for the installation to demonstrate compliance with the European Communities Environmental Objectives (Groundwater) Regulations

- The RD requires monitoring of soil and groundwater for relevant hazardous substances on a risk-based assessment.
- Condition 6 of the RD requires that the integrity and water tightness of all underground pipes, tanks, bunding structures and containers and their resistance to penetration by water or other materials carried or stored therein shall be tested and demonstrated by the licensee.

Potential for Accidents

There is a potential for accident and emergency situations arising from the operations at the installation. Such accident and emergency situations could have implications for the qualifying interests of the SAC.

*Mitigation*

The RD requires that the following controls are in place to protect the qualifying interests of the SAC:

- Condition 3 of the RD states that all pumps, sumps and storage tanks from which spillage of environmentally significant materials might occur in such quantities as are likely to breach local or remote containment or separators, shall be fitted with high liquid level alarms
- Condition 8 of the RD requires that all material and waste shall be loaded, unloaded and stored in designated areas protected as may be appropriate against spillage and leachate run-off.
- Condition 9 of the RD requires the licensee, to ensure that a documented Accident Prevention Procedure is in place that addresses that hazards on-site, particularly in relation to the prevention of accidents with a possible impact on the environment.
- Condition 9 of the RD requires the licensee to have a documented Emergency Response Procedure in place that addresses any emergency situation on-site which should include provision for minimising the effects of any emergency on the environment.
- Condition 12 of the RD requires the licensee to revise an Environmental Liabilities Risk Assessment (ELRA) to assess the risks of accidents/incidents every three years.

### Appendix 3 Air dispersion modelling results for gas oil operation

As part of the previous review, air dispersion modelling was carried out to predict the ambient pollutant concentrations resulting from the CCGT stack emissions when operating on gas oil. Gas oil is used for routine testing (as required by CRU) and otherwise would only be used in the event of an emergency (i.e. an interruption in the gas supply). As a result, the predicted concentrations were assessed against short-term air quality standards/guidelines.

Background concentrations were taken from an average of Zone D (rural Ireland) monitoring stations. The model was run using five years of meteorological data to ensure a full range of meteorological conditions likely to affect dispersion were considered. The results presented are for the worst-case year. The emissions modelled are the same as those in the RD with the exception of PM10, which was modelled at an emission concentration of 50 mg/Nm<sup>3</sup> but the RD specifies an emission limit of 20 mg/Nm<sup>3</sup>.

The table below gives details of the predicted impact of the relevant pollutants.

Parameter	Averaging Period	Background concentration (µg/m <sup>3</sup> )	Process contribution to PEC (µg/m <sup>3</sup> )	Predicted Environmental Concentration (PEC) (µg/m <sup>3</sup> )	PEC as % of Air Quality Standard	Air Quality Standards/Guidelines (µg/m <sup>3</sup> ) <sup>Note 1</sup>
Nitrogen Oxides (as NO <sub>2</sub> )	99.8%ile hourly	14	45	59	30%	200
SO <sub>2</sub>	1 hour (99.73%ile)	6	29	35	28%	125
	24 hour (99.18%ile)	6	48	54	15%	350
PM10	24 hour (90.4%ile)	36	3.7	40	79%	50

Note 1: Air Quality Standards Regulations, SI 58/2009 and 180/2011, unless otherwise stated.

Modelling of CO was not carried out for the plant operating on gas oil; however, it was modelled for natural gas operation at an emission limit value of 100 mg/Nm<sup>3</sup> which is higher than the ELV for gas oil operation (90 mg/Nm<sup>3</sup>). Dispersion modelling demonstrated that CO emissions were compliant with the air quality standard at that ELV (Section 6.1.1).

## Appendix 4 Relevant Legislation

The following European instruments are regarded as relevant to this application assessment and have been considered in the drafting of the Recommended Determination.
Industrial Emissions Directive (IED) (2010/75/EU)
Environmental Impact Assessment (EIA) Directive (2011/92/EU as amended by 2014/52/EU)
Habitats Directive (92/43/EEC) & Birds Directive (79/409/EC)
Water Framework Directive [2000/60/EC]
Groundwater Directive (80/68/EEC) and 2006/118/EC
Medium Combustion Plant Directive (EU) 2015/2193
Air Quality Directives (2008/50/EC and 2004/107/EC)
Seveso Directive (2012/18/EU)
EU Directive 1999/32/EC, (relating to a reduction in the sulphur content of certain liquid fuels and amending Directive 93/12/EEC

## Appendix 5 Other BREF/BAT documents relevant to this assessment

Horizontal BREF	Publication date
Reference Document on the Best Available Techniques on Emissions from Storage	July 2006
Reference Document on the Best Available Techniques for Energy Efficiency	February 2009
Reference Document on the application of Best Available Techniques to Industrial Cooling Systems	December 2001

## Appendix 6 BAT Compliance Conditions

CID/BREF/BAT Document	Section	Additional requirements introduced into RD	Condition/Schedule
Large Combustion Plants CID 2017/1442	1.1 Environmental Management System	BAT 1 Environmental Management System (Additional EMS requirements)	Condition 2.2
Large Combustion Plants CID 2017/1442	1.2 Monitoring	BAT 2: BAT is to determine the net electrical efficiency of the combustion unit	Condition 7.5
Large Combustion Plants CID 2017/1442	1.3. General environmental and combustion performance	BAT 10 In order to reduce emissions to air and/or to water during other than normal operating conditions (OTNOC), BAT is to set up and implement a management plan as part of the environmental management system  BAT 11 BAT is to appropriately monitor emissions to air and/or to water during OTNOC.	Condition 2.2.2.16

Industrial Cooling systems	4.5 Reduction of entrainment of organisms	Reduction of entrainment	Condition 2.2.2.7 (Schedule of Environmental Objectives and Targets)
Industrial Cooling systems	4.6.2 General BAT approach to reduce chemical emissions to water	Reduce emissions of chemical substances to water  Emissions of free (residual) oxidant	Condition 2.2.2.7 (Schedule of Environmental Objectives and Targets)  Schedule B.2 Chlorine ELV

## Appendix 7 Acknowledgement and Attribution:

**Table 1:** Acknowledgement and attribution of the imagery used in **Appendix 1** of this report.

Map Source	Link to Source	Data Provider Note 1	Usage Licence	Attribution Statement	Location in Report
OpenStreetMap (EPA Maps)	Figure 1, Figure 3 <a href="https://gis.epa.ie/EPAMaps/default">https://gis.epa.ie/EPAMaps/default</a>	OpenStreetMap	<a href="https://www.openstreetmap.org/copyright">https://www.openstreetmap.org/copyright</a>	Map Data: © OpenStreetMap contributors	Appendix 1
Microsoft Bing Maps	Figure 2 <a href="https://www.bing.com/maps?FORM=Z9LH2">https://www.bing.com/maps?FORM=Z9LH2</a>	Maxar Technologies  TomTom	Microsoft Terms of Service: <a href="https://www.microsoft.com/en-us/maps/product/print-rights">https://www.microsoft.com/en-us/maps/product/print-rights</a>	Microsoft, Maxar Technologies, TomTom Map data ©2021	Appendix 1