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SSE Generation Ireland Limited

Campile, New Ross, Co Wexford

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Non-Technical Summary

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Non-Technical Summary

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

The 464MW natural gas fired Combined Cycle Gas Turbine (CCGT) power plant was constructed within the confines of an ESB power plant. The gas-fired station entered commercial operation in 2015, replacing the former oil-fired station at the site. It is one of the cleanest and most-efficient power stations on the island of Ireland, generating enough electricity to power half a million Irish homes.

A gas turbine, burning natural gas, drives a generator for electricity production. Exhaust gases from the gas turbine pass through a Heat Recovery Steam Generator (HRSG) to generate high-pressure steam. The steam generated in the HRSG drives a steam turbine, which also turns the generator providing additional electrical power. The steam is condensed back to water via a Condenser for re-use in the HRSG. This condenser is cooled by a once through direct cooling system.

The CCGT has a primary fuel source of natural gas directly supplied by Bord Gais, and has the capability to switch to distillate oil as a secondary fuel. Distillate oil is stored in bunded holding tanks on site, filled directly from boats that can operate from the SSE owned jetty.

The installation has been licensed by the EPA to operate in line with the Industrial Emissions Directive and associated BAT and BREF documents. A licence was initially issued to the ESB for operating a power station on site in 2001. In 2011, an Integrated Pollution Prevention and Control Licence was issued to Endesa Ireland Limited for the installation of a CCGT power plant. The licence has undergone 3 technical amendments including change of ownership and updating the licence in line with the Industrial Emissions Directive.

The licensee is now making an application to the EPA to review its licence to account for the following changes:

- Approve the use of emission point SW8 for return of cooling water screen wash waters;
- The reintroduction of storm water line SW7 for discharging uncontaminated rainfall;
- Update the licence in line with Commission Implementing Decision (EU) 2017/1442 of 31 July 2017 establishing best available techniques (BAT) conclusions under the Directive 2010/75/EU of the European Parliament and of the Council, for large combustion plants;
- Amend the frequency for testing oils on storm waters in line with EPA / SSE agreement from daily to monthly;
- Include a discharge condition for SW11 in the licence.

The company is committed to providing electricity generation with a high-quality service in a sustainable way. This is reflected in their accreditation ISO 14001 environmental management system.

Great Island CCGT:

The CCGT operational area occupies approximately 19 acres of the 143 acres of the Great Island Power Plant site. Older buildings from the previous ESB power plant are still in place on site, adjacent to the operational area of the CCGT plant.

The combined cycle process consists of two thermodynamic cycles working together to produce electricity as efficiently as possible. The first cycle comprises a gas turbine and an electrical generator coupled together on one main shaft, which rotates at high speed. The gas turbine consists of a compressor section, a combustion chamber and a turbine section. Air is drawn in through an intake filter, compressed and fed into the combustion chamber where fuel is injected and ignited. The resulting hot combustion gases passing through the turbine section rotate the shaft, driving the compressor and the electrical generator to produce the rated electrical power output. Operation of a gas turbine, as described above, is referred to as open or simple cycle mode.

It is possible to generate approximately 50% more electricity from the hot exhaust gases by passing them through a HRSG or boiler, which uses the heat from the exhaust gases to generate steam, which is fed to a steam turbine. Exhaust gases from the CCGT are discharged to the atmosphere via a stack located at the outlet of the HRSG.

The high pressure steam produced in the HRSG is supplied through inter-connecting pipework to the steam turbine which is coupled to the same generator as the gas turbine (i.e. 'single shaft' design), further driving the generator to produce more electricity. The steam is expanded to vacuum conditions in the steam turbine to extract as much energy as possible. The steam is then fed to the Condenser where it is condensed back to water and fed back to the HRSG to generate more steam thereby conserving water within a closed cycle. The cooling required for the condensing the steam back to water is provided by once through cooling water from the local estuary.

The station is prepared to operate on a continuous basis, 365 days per year with personnel working in shift arrangement. The number of working hours required from this installation is determined by EirGrid, who manage the entire electricity supply network.

The CCGT has a nominal capacity of 464 MW and exports electricity, via an underground cable, to the onsite existing switchyard. The plant normally operates on full load resulting in a plant efficiency of approximately 58%.

Great Island Security:

There is a security building at the entrance to this site which is occupied permanently by security personnel. The installation is enclosed in its entirety by secure perimeter fencing.

Great Island Parking:

Car parking facilities are made available outside the boundary of the installation for most traffic with only permitted vehicles allowable on internal roads.

The installation provides for a second designated car park area inside the boundary at the main offices. The control room, operations and canteen are located in this building.

Contractors who would be on site for longer periods of time in significant development or maintenance projects are provided with a separate contractor's compound for storage, offices and parking within this site boundary.

1. Class of Activity:

The activity falls under Category 2.1: Combustion of fuels in installations with a total rated thermal input of 50MW or more.

2. EIAR/ EIS and Planning Permission Documents

An EIAR has not been complete as part of this particular application. An EIA was complete as part of the original application and is on public file with the EPA. Planning permission is in place for the current activity and evidence has been included in the application to support this.

3. BAT Guidance Documents Assessed:

Commission Implementing Decision (EU) 2017/1442 of 31 July 2017 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for large combustion plants.

4. Emissions

4.1 Emissions to Atmosphere

There is one main emission point from the CCGT. The plant operates on natural gas, but has the capability to operate with distillate oil in case of a change in circumstance requiring a change in fuel.

Parameter	Test Frequency as per licence	Daily Licensed Emission Limit Value	Units	Abatement
A2-1 On Natural Gas				
Oxides of Sulphur	Continuous	10	mg/m ³	N/a
Nitrogen oxides	Continuous	50	mg/m ³	N/a
Dust	Continuous	5	mg/m ³	N/a
Carbon Monoxide	Continuous	100	mg/m ³	N/a
Emission Volume	Continuous	2,756,520	m ³ / hr	N/a
A2-1 On Gas Oil				
Oxides of Sulphur	Continuous	50	mg/m ³	N/a
Nitrogen oxides	Continuous	90	mg/m ³	N/a
Dust	Continuous	20	mg/m ³	N/a
Carbon Monoxide	Continuous	100	mg/m ³	N/a
Emission Volume	Continuous	2,987,280	m ³ / hr	N/a

- The value of the 95% confidence intervals of a single measured result shall not exceed the following percentages of the emission limit values:

Nitrogen Oxides (as NO_x) 20%;
 Carbon Monoxide (CO) 10%;
 Sulphur dioxide (as SO₂) 20%;
 Dust (Particulate Matter) 30%.

- The validated hourly and daily average values shall be determined from the measured valid hourly average value after having subtracted the value of the confidence interval specified above. Any day's results in which more than three hourly average values are invalid due to malfunction or maintenance of the continuous measurement system shall be invalidated. If more than 10 days a year are invalidated the licensee shall take action as appropriate to improve the reliability of the continuous monitoring system;
- No validated daily average value shall exceed 110% of the emission limit value;

- 95% of all the validated hourly average values over the year shall not exceed 200% of the emission limit value;
- No validated monthly average value shall exceed the emission limit value.

4.2 Emissions to Water

SW2 – Condenser Cooling Water

There are no changes requested to the existing licensed emission point. The same volumetric discharge and concentration limits are to be applied in the amended licence.

Parameter	Test Frequency	Licensed Emission Limit Value	Abatement
Temperature	Continuous	12°C above estuarine water; 10°C (98%ile of hourly values over a year)	N/a
Chlorine	Weekly	0.3 mg/l	N/a
Emission Volume	Continuous	33,000 m ³ /hr, 792,000 m ³ /day	N/a

SW3a – Foul Water Treatment System

There are no changes requested to the existing licensed emission point. The same volumetric discharge and concentration limits are requested for the amended licence.

Parameter	Test Frequency	Licensed Emission Limit Value	Abatement
pH	Daily	6 – 10	Wastewater Treatment plant
BOD	Bi-annual	25 mg/l	
Suspended Solids	Bi-annual	35 mg/l	
Ammonia	Bi-annual	5 mg/l as N	
Total Phosphorous	Bi-annual	2 mg/l as N	
Emission Volume		9.5 m ³ /day	

SW8 – Cooling Water Screen Wash Water

One of the reasons for a licence review is to reintroduce this emission point into the licence schedules. This point was to cease discharging on commencement of the CCGT, however it is requested to retain this point on the amended licence. There are no changes requested to the existing licensed emission point. The same volumetric discharge and concentration limits would be applied in the amended licence, although it is acceptable to reduce the chlorine concentration from 0.5 mg/l to 0.3mg/l in line with SW2. There will be no impact from the reintroduction of this discharge location, as the water from this point was to be combined and discharged via SW2.

Parameter	Test Frequency	Licensed Emission Limit Value	Abatement
Chlorine	Quarterly	0.5 mg/l	N/a
Volume	-	1,970 m ³ /day	

SW13 Process Wash Water

There are no changes requested to the existing licensed emission point. The same limits are to be applied in the amended licence.

Parameter	Test Frequency	Licensed Emission Limit Value	Abatement
pH	Continuous	6 – 9	Holding tank with continuous metering systems – batch discharge used
BOD	Monthly	20	
Suspended Solids	Quarterly	30	
Mineral Oil	Monthly	20	
Ammonia (as N)	Quarterly	5	
Phosphorous (as P)	Monthly	5	

4.3 Storm water Emissions

There are five (5) storm water emission points at the installation that discharge rainwater to the Barrow estuary. One of the reasons for the application for a licence review was to include storm water emission point SW7 into the licence.

Parameter	Test Frequency	Licensed Emission Limit Value	Abatement
SW1			
TPH	Amend to Monthly	N/a	Oil and silt interceptor
Suspended Solids	Monthly	N/a	
SW3b			
TPH	Amend to Monthly	N/a	Oil and silt interceptor
Suspended Solids	Monthly	N/a	
SW4			
TPH	Amend to Monthly	N/a	Oil and silt interceptor
Suspended Solids	Monthly	N/a	
SW12			
TPH	Amend to Monthly	N/a	Oil and silt interceptor
Suspended Solids	Monthly	N/a	
SW7			
TPH	Monthly	N/a	Oil and silt interceptor
Suspended Solids	Monthly	N/a	

4.4 Emissions to Ground

There has been a wastewater treatment plant installed in the contractor compound to treat effluent from toilets and canteen. Specific details of the wastewater treatment plant have been included in this application. Treated effluent from the plant are discharged to ground via a designed percolation area.

4.5 Noise Emissions

Noise has not been an issue from this installation since its commencement. The licence will be amended to account for evening time noise as applied in new licences and the EPA guidance note NG4.

Parameter	Test Frequency	Licensed Emission Limit Value L _{Aeq,r}
Broadband Noise	Annual	55 dB Day / 50dB Evening / 45dB Night
Tonal Noise Assessment	Annual	None
Impulsive Noise	Annual	None

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5. EC (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2006

The licensee has assessed the activities carried out and determined that the installation is classified as a Seveso site under SI 74 of 2006 which gives effect to European Directive 96/82/EU (Seveso II Directive). The installation is classified as a lower tier establishment. All aspects of this Regulation are implemented, assessed and addressed to ensure compliance with the specific requirements.

6. Derogation under Section 86A(6)

Not Applicable

7. Fuels

The site operates primarily on Natural gas, directly supplied by transmission network therefore there is no storage of gas at the installation.

The CCGT has the capability to operate on gas oil stored as back up in case of interruption to the gas supply, or other irregularity in the market. Gas oil is stored and banded in line with the standard requirements and the EPA Guidance note "Storage and Transfer of Materials for Scheduled Activities".

8. Energy and Water

Electricity used to power plant and buildings is obtained from the national grid.

Potable water used in the process is obtained from Wexford County Council public supply. The water is stored in a service reservoir prior to treatment. Demineralised water used as feed water for the HRSG is produced from the water treatment plant.

Cooling water is obtained from the Barrow estuary in accordance with existing licence conditions. This water is subsequently returned to the estuary via SW2, with back wash water from the inlet screen discharged via SW8.

9. Raw Materials

There is a small range of raw materials used on site. Any liquid materials which could potentially have an environmental consequence are stored in purpose designed and covered bunds. A list of all the materials used on site have been included in the body of this application.

10. Baseline Condition of the site

SSE has in general uncontaminated soil and ground water within the installation boundary. There is however an area of land which was used by previous owners between the 1960s – 1990s for waste disposal activities. The installation was originally utilised by the ESB for power generation, consuming heavy fuel oil.

These areas do not form part of the CCGT, and the CCGT does not interact with these areas in any way, however they are monitored as part of IE Licence requirements and therefore have been considered as part of this licence review.

There is contamination in the groundwater wells at the installation. The site will continue monitoring the wells for specific parameters as required by the Agency in line with existing licence arrangements. There is no immediate requirement for remediation unless the site would intend to change its use. The contamination is not or was not associated in any way with operations by SSE or the CCGT.

11. Waste

Waste is controlled by the waste management hierarchy. At all stages prevention of waste is the key goal of SSE. Where materials can be reused or recycled they are to improve efficiency and reduce raw material inputs. Disposal is the last route of choice for the waste materials at the installation. Assessment of waste management is a key part of the environmental management system ISO 14001 on site. This is reviewed routinely and externally audited on an annual basis.

Hazardous wastes generated by the installation include waste oil, waste acid and alkali, cleaning waste and waste electrical and electronic waste. Non-hazardous waste includes municipal waste (canteen and office waste) and effluent treatment sludge's. Waste recovery and disposal is controlled by licence conditions which require the waste to be transferred to authorised waste recovery/disposal facilities.

Detailed waste registers are maintained and submitted to the Agency in summarised form, as part of the annual environmental report.

12. Standards

The CCGT has had an IPPC / IE licence since prior to commencing operations. It has therefore operated under strict conditions as applied by the EPA and been subject to routine audits by the EPA.

The company has implemented and operates an accredited Environmental Management System, ISO 14001. This is externally audited and the site verified as compliant with the conditions of the standard for operation of this installation in an environmentally sound manner.

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