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YSF Energy Centres Ltd Application for a Bespoke MCPD Environmental Permit EPR/WE1981AB

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Non-Technical Summary

The application is for a 7.102MW(Th) input Combined Heat and Power (CHP) plant comprising two identical units. The CHP plant will consume natural gas to power a reciprocating engine / generator, the electricity produced will be wholly consumed by the adjacent food processing installation which it serves. Heat exchangers will be used to collect waste heat from the engine, this will be used to heat a thermal oil ringmain operated by Young's Seafood Limited serving the wider facility.

Pre-application consultation with the EA confirmed that as the operator is a separate legal entity to that operating the existing permitted installation Young's Humberstone Road (EPR/BQ1972IR) that the plant is to serve (providing 100% of the heat and power) that the application should reference that it is a 'Multi Operator Installation' (MOI) where the activity is a Directly Associated Activity. The CHP will be owned and operated by YSF Energy Centres Ltd.

The main potential impact from the activity is the release of combustion gases from the operation of the CHP units. Results of air dispersion modelling taking account of all sources of combustion gases across the wider installation show that predicted pollutant concentrations were below the relevant Environmental Quality Standards (EQS) at all locations for all meteorological data sets modelled. Resultant impacts were classified as not significant for all human receptors. Impacts were also modelled at relevant ecological sites. The results indicated that emissions from the plant were not predicted to significantly affect existing conditions at any designation.

It is concluded that the addition of the CHP to the wider installation will be managed sufficiently so as to present a low ongoing risk to the environment.

1 What operations are you applying for?

Table 1a Types of Activities

Schedule 1 listed activities						
Installation Name	Schedule 1 References	Description of the activity	Activity daily capacity	Annex IIA or IIB (disposal and recovery) codes	Hazardous waste treatment capacity	Non-hazardous waste treatment capacity
Humberstone Road Energy Centre	New Medium Combustion Plant	<p>Operation of up to two CHP engines with a total thermal input of approximately 7.102 MWth/3.04 MW(e).</p> <p>The generators will burn natural gas solely for the purpose of providing electricity and heat to the Young's Seafood installation (permit Ref EPR/BQ1972IR). The CHP plant is directly associated to this installation. This is a multi-operator application.</p>	7.102 MW(Th)	-	-	-
Directly associated activities (See note 4)						
Name of DAA	Description of the DAA (please identify the schedule 1 activity it serves)					
-	-					
For installations that take waste	Total storage capacity			N/A		
	Annual throughput (tonnes each year)			N/A		

2 Emissions to Air, Water and Land

Table 2 Emissions

POINT SOURCE EMISSIONS TO AIR					
Emission Ref.	Point	Source	Parameter	Concentration	Unit
A25		CHP	NOx	95	mg/m ³
A26		CHP	NOx	95	mg/m ³

*Based on compliance with MCPD

The CHP plant will comply with the relevant ELV's in the Medium Combustion Plant Directive. Annex II Part 2, Table 1 of the MCPD sets out ELV's for new combustion plant other than engines and turbines; Table 2 of the MCPD sets out ELV's for new engines and gas turbines:

Table 2.1 MCPD ELV's

Pollutant	Type of MCPD	Gas Oil	Liquid Fuels other than Oil	Fuels other than Gas	Natural Gas	Gaseous fuels other than natural gas
NOx	New medium combustion plant other than engines and turbines.	-	-	-	100	-
SO2	Engines and gas turbines	-	120	-	-	15
NOx	Engines	190	190	95	190	190
	Gas Turbines	75	75	50	75	75
Dust	Engines and Gas Turbines	-	10	-	-	-

The CHP plant will comply with the emission limit of 95mg/m³ for NOx for engines burning natural gas.

There are no discharges from the activity to land, surface water or sewer. The CHP units are located in a former boiler house. The site drainage infrastructure and hard standing will not be impacted by the operation of the CHP units. The operation and maintenance of these assets will remain the responsibility of Young's Seafood Ltd under its existing permit.

3 Operating Techniques

3.1 Pre-Application Discussions

Pre-application advice was sought from the Environment Agency to confirm the type of application to be made. A response was received from Eloise Murray on 12 March 2021 confirming the operator should submit an application for a new bespoke Medium Combustion Plant. The officer confirmed that as the operator is a separate legal entity to that operating the existing permitted installation Young's Humberstone Road (EPR/BQ1972IR) that the plant is to serve (providing 100% of the heat and power) that the application should reference that it is a 'Multi Operator Installation' (MOI) where the activity is a Directly Associated Activity. The CHP will be owned and operated by YSF Energy Centres Ltd.

The officer advised the operator that 'Where a combustion plant which is an MCP and also a DAA to a Part A(1) activity is operated by a separate operator to the Part A(1) activity, the operator will have to apply for a DAA permit. The application will have to be considered in the same way as for a new bespoke permit'.

Young's Seafood Ltd has already applied for a normal variation to its permit (EPR/BQ1972IR) to account for changes at the site brought about by the extension to its F Factory operations and inclusion of the CHP activity applied for in this application as a Directly Associated Activity (DAA).

3.2 Summary of Operations

YSF Energy Centres Ltd are experienced operators of CHP facilities to meet the emissions standards required by the Medium Combustion Plant Directive (MCPD). Two identical MTU type 12V4000 GS engines will be installed within the existing redundant former boiler room with the existing permitted installation operated by Young's Seafood Ltd (Permit ref BQ1972IR) and linked to the site's electrical and natural gas connections and new thermal oil loops to serve the existing and new frying lines. The CHP installation will therefore both generate electricity that will be wholly consumed by the adjacent facility and via heat recovery systems recover waste heat from exhaust gases for the heating of thermal oil that will offset the need for Young's Seafood to operate its own convention thermal oil boilers.

The following specification of equipment and services are relevant to this application:

- installation of 2no.1521kWe (3.551MWth) natural gas fired CHP units;
- installation of heat recovery systems within the CHP newly reconfigured plant room; capable of producing heat from the CHP exhaust gases;
- Installation of heat rejection equipment consisting of radiators for rejection of engine jacket/oil and low temperature intercooler heat;
- Lube oil store; and
- On-site testing and commissioning, operation and maintenance of CHP plant

CHP Engine

Two new 1521kWe spark ignited reciprocating gas engines will be installed. The MTU engines selected are modern lean-burn low emission four stroke turbocharged engine with a two-stage intercooler equipped with a management system that provides control and protection of the primary function of the unit. Generator supplier specification sheets are included at Appendix 2.

Heat Recovery System

The heat recovery system incorporates high temperature heat and low temperature recovery systems to maximise the recovery heat from the engine water jacket and the exhaust gases. Heat exchangers will be used to collect waste heat from the engine, this will be used to heat a thermal oil ring main serving the factory.

Heat Rejection System

If the heat generated in the heat recovery systems cannot be utilised, it will be diverted by a control valve to a horizontal, dump radiator with motor driven fans incorporating a heat rejection circuit. The fans are temperature controlled to minimise the parasitic load.

Emissions Control Systems

The combustion process for the unit is regulated and will be optimised and continuously monitored through the automated control systems to ensure complete combustion to minimise the formation of carbon monoxide. The unit employs a dry low-NOX combustion system to reduce peak flame temperature and minimise NOx formation.

Lube Oil Storage

The engine lube oil system will be connected to an automatic lube oil system. The system provides for automatic level control of lube oil in the engine sump between service intervals. The system comprises of:

- Lube oil tank with drip tray to collect 110% of the tank contents
- Level switch on the engine sump and electric driven lube oil pump

CHP Systems Control

The CHP control panel is designed to control and protect the CHP installation. The system enables controls and monitoring to be done remotely including:

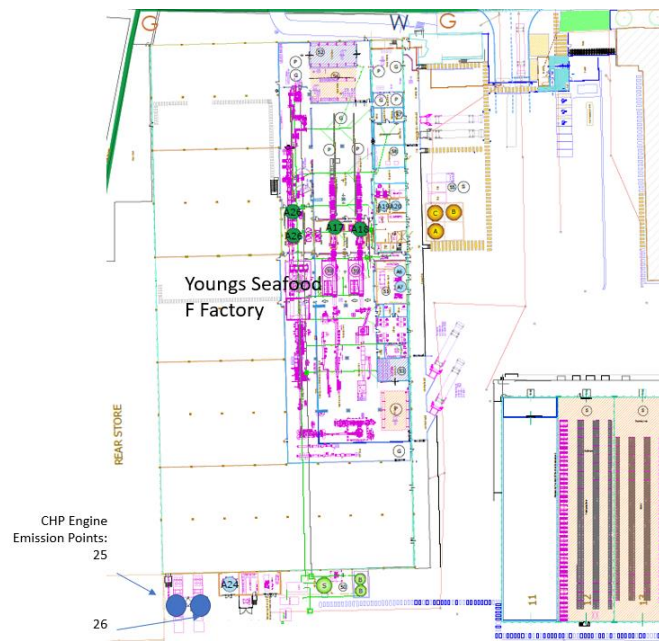
- Starting, control and protecting the unit
- Modulation of the engine output dependent on electrical demand
- Self-diagnosis, fault identification and reset

CHP mechanical, thermal and electrical performance is continuously monitored including:

- Cylinder exhaust gas temperature
- Exhaust temperature entering the exhaust gas heat exchanger,
- Exhaust temperature leaving the exhaust gas heat exchanger,
- Engine water temperature
- Lubricating oil temperature
- Gas inlet, air inlet and enclosure ambient temperatures,
- Oil pressure,
- Voltage, current, power frequency and power factor,
- Unit status,
- Electric, gas flow and heat

Should pre-determined critical levels be exceeded, the system will shut down the CHP unit and relay the fault to an engineer. The shutdown sequence would either be a controlled soft stop or hard stop depending on the type of fault.

CHP location is shown below. For the overall installation is in context See Appendix 2, Drawing 1



3.2.1 General Requirements

The new CHP plant is entirely contained within an existing redundant former boiler room which is part of the existing Young's permitted installation. There are no surface water or process effluent generated as a result of the operation of the CHP and will have no impact on infrastructure and controls on surface water and foul drains operated by Young's.

YSF Energy Centres operates management processes for all activities on CHP installations. These processes include Standard Operating Procedures (SOP), Risk Assessments and Method Statements (RAMS) for work undertaken by operators and contracting parties. Deliveries to and interaction with the CHP plant mainly involving handling of lubricants is undertaken by competent personnel trained in YSF and site arrangements for responding to spills and leaks. To support this a spill kits is located within the CHP room. The spill kits will be inspected as part of a Planned Preventative Maintenance (PPM) schedule.

Any waste including lube and other engineering consumables will be stored within the CHP plant room in designated, labelled containers and disposed of via licensed contractors.

Regular EHS walks and audits take place by both the CHP operator's personnel and Young's Seafood which include visual inspection of the CHP facilities.

There is no potential for fugitive emissions to air from the operation of the CHP plant.

There are no sources of odour associated with the CHP plant.

There is limited potential for offsite noise nuisance from the operations of the CHP plant as all equipment is located within a former existing redundant former boiler room away from any sensitive boundaries. The fabric of the building has been upgraded as part of this project and will further reduce noise nuisance potential.

3.3 Types and Amounts of Raw Materials

Table 3 Raw Materials Inventory

Schedule 1 Activity	Description of raw materials and Composition	Max Amount (litres)	Annual Throughput (litres each year)
New MCPD Activity	Lubricant	280	2,200 litres

3.4 Management Systems

YSF Energy Centres Ltd will operate a management system that is aligned to the requirements of the Young's environmental management system and arrangements at the wider Humberstone Road installation. This will include but is not limited to clearly allocated roles and responsibilities; operating procedures for operations that may have an adverse impact on the environment; planned preventative maintenance regime and routine inspections of plant and equipment; routine monitoring of key plant performance parameters including energy, waste arisings and raw materials use; training to ensure personnel are suitably inducted and trained in relevant environmental procedures; procedures for the investigation of any potential complaints; contingency plans, mutual arrangements and escalation procedure to be used in the event of breakdowns of key plant and equipment or unplanned events; regular review of performance by the management team of both operators at the installation against set performance and improvement targets; audits of compliance against relevant procedures and legal requirements; non-conformances and corrective and preventive actions process and the retention of records demonstrating compliance with the permit and any other applicable legislation. In addition, a procedure will be agreed between all parties covering the management of change including potential environmental impacts of any planned changes that may impact either party.

4 Monitoring

4.1 Describe the measures you use for monitoring emissions

Monitoring of the CHP plant will be incorporated into an annual emissions monitoring programme for the installation as required by the permit.

4.2 Point source emissions to air only

As above.

5 Environmental Impact Assessment

5.1 5a Have your proposals been the subject of an EIA under Council Directive 85/337/EEC?

No

6 6. Resource Efficiency and Climate Change

6.1 Describe the basic measures for improving how energy efficient your activities are?

YSF Energy Centres Ltd has a rigorous design process to ensure that its operations and technology selection takes account of energy efficiency at its core. The company recognises the importance of the design and development stages of a project in ensuring its activities and those of their customers are as energy efficient as possible.

Efficiency of operations of the CHP plant are reviewed on a continuous basis to meet the commercial and environmental objectives of Young's operations which will in turn ensure effective energy use and distribution of heat and electricity in response to demand. In carrying out these activities the operator will be continuously actively engaged with Young's to ensure that their requirements are supported.

6.2 Provide a breakdown of any changes to the energy your activities use and create

The estimated energy use for a typical 12-month period when operating at full load is 31,636 MWh/yr for each unit.

6.3 Have you entered into, or will you enter into, a climate change levy agreement?

The CHP plant is new and is therefore not eligible to enter into a Climate Change Agreement.

6.4 Tell us about, and justify your reasons for, the raw and other materials, other substances and water you will use

As stated, the operator has outlined the standards required for the management of resource and is the overriding consideration at the design stage. In reality, there are very few raw materials or consumables other than energy (natural gas) and small quantities of lubricant alongside ad hoc engineering consumables.

6.5 Describe how you avoid producing waste in line with Council Directive 2008/98/EC on waste

The installation will generate very small volumes of controlled waste through the operation of the two CHP units.

7 Installations that include a combustion plant (excluding waste incinerators)

Is your permit variation application for a new activity or substantially refurbished activity for medium combustion plants with a total aggregated thermal input of 20MW thermal or more?

No. The unit is not greater than 20MW thermal input capacity.

8 Environmental Risk Assessment

The following section addresses the potential impact of the proposed changes on the surrounding area. Table 4 below provides a summary of identified risks to the environment from the CHP installation.

Location of Sensitive Receptors

In order to assess the impact of the installation on the surrounding environment, sensitive receptors have been identified.

The sensitive environmental receptors were identified using the Government Website www.magic.gov.uk. In identifying sensitive environmental or natural receptors, a 10km radius around the site has been considered. Human receptors were identified using a local knowledge of the area and appropriate web based searches. When identifying the sensitive human receptors, a 1km radius around the site was considered. There are residential dwellings including commercial properties nearby.

The search resulted in the identification of a number of designated sites, these are summarised in Table 5 below. Location of human receptors around the site can be found in within the air quality assessment (Appendix 4).

Table 5 Identification of Important and Sensitive Receptors

Name of Receptor (designation/distance/direction)	Nature of Receptor	Emission which may impact on the receptor and their relevant pathways
Ecological Receptors (Statutory)		
Humber Estuary SAC, SPA, Ramsar and SSSI 2 km NE	The Humber Estuary is a nationally important site with a series of nationally important habitats. These are the estuary itself (with its component habitats of intertidal mudflats and sandflats and coastal saltmarsh) and the associated saline lagoons, sand dunes and standing waters. The site is also of national importance for the geological interest at South Ferriby Cliff (Late Pleistocene sediments) and for the coastal geomorphology of Spurn. The estuary supports nationally important numbers of 22 wintering waterfowl and nine passage waders, and a nationally important assemblage of breeding birds of lowland open waters and their margins. It is also nationally important for a breeding colony of grey seals <i>Halichoerus grypus</i> , river lamprey <i>Lampetra fluviatilis</i> and sea lamprey <i>Petromyzon marinus</i> , a vascular plant assemblage and an invertebrate assemblage.	Air Emissions
Ecological (Non-Statutory)		
Weelsby Woods Park LNR 0.9 km S	The original parkland of Weelsby Woods was laid out over 150 years ago and many of the ornamental trees date from this period. The parkland is a wide open area with many notable trees - dominated in the centre with a cluster of Scots pines.	Air Emissions
Grimsby Cemetery LWS approx. 2 km SW		Air Emissions
Gooseman's Field and Big Humphrey LWS approx. 1.8 km SW		Air Emissions
Weelsby Park LWS approx. 0.6 km SW		Air Emissions
Weelsby Field LWS approx. 1km SSE		Air Emissions
ABP Wasteland LWS approx. 1.6 km NE		Air Emissions
Chapman's Pond LWS approx. 1.8 km ENE		Air Emissions

Water Receptors

River Freshney

Surface Water Emissions

Approx. 3km NW

Humber Estuary – as above

Human Receptors

7 Schools within 1km radius of the site; closest school 140m from installation boundary.

Odour/noise/air emissions

3 sports or recreation grounds within 1km radius of the site; closest recreation ground adjacent to site boundary to the North.

Odour/noise/air emissions

Residential areas of Weelsby, Old Cleve and Holmes Hill surrounding the site.

Odour/noise/air emissions

Commercial properties along Ladysmith Road

Odour/noise/air emissions

Impact of Emissions to Air

The principal emissions to atmosphere from the CHP operation are identified in Table 2. This section presents the approach to the assessment of the impact of these emissions, on the local receiving environment. The information and assessment is presented within Appendix 4 which includes the combined impact from air emissions from all releases from the operation of the wider installation (Young's Seafood and YSF Energy Centres combined). This assessment was submitted by Young's Seafood Ltd in support of their latest application to vary EPR/BQ19721R accounting for changes to F2 factory and the CHP installation to understand cumulative impact of emissions.

The report concludes concentrations of all pollutants from combustion plant are below the relevant EQS at off-site locations for human and ecological receptors under all meteorological conditions. The assessment represents the worst-case scenario not all combustion plant will be operating continuously.

Impact of Noise

There are no significant additional external sources of noise arising from the CHP. All equipment will be inspected and maintained as part of the PPM regime in order to ensure optimal operation and minimisation of any potential noise. Noise is not considered a significant issue.

Odour

The CHP installation has no discernible odour sources and does not present an odour nuisance risk.

Table 4 Environmental Risk Assessment Summary

Hazard	Receptor	Pathway	Risk Management Technique	Probability of Exposure	Consequence	Overall Risk
Emissions to air –CHP	See Table 8	Air Dispersion	Combustion controller;	Emissions during hours of operation	Breach of local EAL's	See Air Dispersion Assessment..
Noise – CHP	See Table 8 – Human Receptors	Airborne	PPM for all equipment;	Emissions during hours of operation;	Complaints of noise	Low – no complaints likely
Fugitive Emissions to surface water, sewer and groundwater – accidental leaks and spills – lube	River Freshney; Pyewipe Waste Water Treatment Works	Drainage system; overground; Minor Aquifer	No direct surface water release point – combined sewer; Hard standing bunded engine lube storage facility is installed to serve the CHP engines	Low	Pollution of River Freshney; potential to disrupt WWTW	Low – low potential for pollution incidents have occurred.
Emissions of trade effluent to sewer/controlled water	N/A					
Odour	N/A					
Pests	N/A					
Fugitive Emissions to Air – dust, litter etc.	N/A					
Fugitive emissions to air	N/A					

Emissions to Surface Water and Groundwater

There are no direct or indirect emissions to ground, surface water or sewer as a result of operating the CHP. An automatic bunded engine lube storage facility is installed to serve the CHP engines as described above. There are no changes to the drainage infrastructure. The CHP will have no impact on the controls on surface water and foul drains operated by Young's.

Conclusion

The impact of the extension to the installation has been summarised in Table 4. It is concluded that the addition of the CHP to the wider installation will be managed sufficiently so as to present a low ongoing risk to the environment.

Appendix 1

Medium Combustion Plant Checklist

MCP Site Specific Identifier	MTU 12V4000 GS 01	MTU 12V4000 GS 02
Grid Reference	TA 28459 08582	TA 28460 08577
Rated Thermal Input (MW) of MCP	3.51	3.51
Type of MCP	CHP engine	
Types of Fuel Used	Natural gas	
Date new MCP first in operation	Commissioning from 1 st September 2021	Commissioning from 1 st December 2021
Sector of activity of the MCP or the facility in which it is applied (NACE code**)	C.10.51	C.10.51
Expected number of annual operating hours of the MCP	8,760	8,760
Average Load in Use (%)	100%	100%
Where the option of exemption under Article 6(8) is used, a declaration signed here by the operator (as identified on Form A) that the MCP will not be operated more than the number of hours referred to in this paragraph	N/A	N/A
Stack Height (m)	11 metres	11 metres
Distance to nearest human receptor (m)	Knight Street property 200m	Knight Street property 200m
Distance to nearest ecological receptor (m)	Weelsby Woods Park LNR; 651m Humber Estuary (SAC, SPA, Ramsar and SSSI); 2100m	Weelsby Woods Park LNR; 651m Humber Estuary (SAC, SPA, Ramsar and SSSI); 2100m

Generator Checklist

Specific Identifier	MTU 12V4000 GS 01	MTU 12V4000 GS 02
Rated Thermal Input of generator (MWth)	3.51	3.51
Total rated thermal input of all generators on site in MW thermal	7.02	7.02
Grid Reference	SS65390130 (Easting: 265387, Northing: 101299)	
Commissioning Date	Commissioning from 1 st September 2021	Commissioning from 1 st December 2021
Technology (engine/turbine)	CHP Engine	CHP Engine
Types of Fuel Used	Natural gas	Natural gas
Annual Hours	8,760	8,760


Annual Load (%)	100%	100%
Distance to nearest human receptor (m)	Knight Street property 200m	Knight Street property 200m
Distance to nearest ecological receptor (m)	Weelsby Woods Park LNR; 651m Humber Estuary (SAC, SPA, Ramsar and SSSI); 2100m	Weelsby Woods Park LNR; 651m Humber Estuary (SAC, SPA, Ramsar and SSSI); 2100m
Background NO2 ($\mu\text{g}/\text{m}^3$)	13.14	13.14
If your generator is in an AQMA please give details	N/A	N/A

Appendix 2

Drawing 1 Site Plan – Youngs Seafood Installation Boundary



Drawing 1 –
Installation Boundary
– Emission Point
location (A25/A26)

 Boundary of CHP DAA

Emission Ref	Source
A1	C Factory Fryers
A2	"
A3	"
A4	"
A5	E Factory Fryers - Rotacyclone
A6	F Factory Hot Water Boilers
A7	"
A8	C Factory Thermal Oil Boilers
A9	"
A10	"
A11	"
A12	E Factory Thermal Oil Boilers
A13	"
A14	Removed
A15	Steam Boilers
A16	"
A17	F Factory Fryers
A18	"
A19	F Factory Thermal Oil Boilers
A20	F Factory Thermal Oil Boilers
A21	Scraps Fryer (existing emission point)
A22	F2 Factory Fryer - New
A23	F2 Factory Fryer - New
A24	F2 Factory Thermal Oil Boiler - New
A25	CHP 1
A26	CHP 2

Appendix 3

Generator Supplier Specification Sheets

Appendix 4

Air Quality Assessment

Appendix 5

Climate Change Risk Assessment