BESPOKE
ENVIRONMENTAL
SUPPORT

ENVIRONMENTAL PERMIT VARIATION

V007 Supporting information

Client: British Steel Ltd

Document date: 4 October 2024

Contents

1 Introduction

This document has been prepared to support the variation of British Steel's environmental permit EPR/RP3206BE at Scunthorpe integrated iron and steelworks.

This document contains two amendments that are required to the current installation permit in order to align it to current site operations.

These are:

1) Amendment to the raw materials, fuels and emission limits associated with the combustion of gaseous fuels in the works' combustion activities
2) Addition of a Part A2 installation activity relating to the surface treatment (coating) of rail products with zinc.

2 Form Part A: Q5c – Details of company directors

The following individuals are currently relevant officers of British Steel Limited:

Secretary & Director	Date of birth
Damian Paul **HARGREAVES**	[redacted]
Other directors	
AN Zengwei	
CAO Xijun	
HAN Xi Feng	
LI Huiming	
ZHANG Wei	

3 Form Part C2: Q1a – Pre-application discussions

No specific preapplication discussions were held with NPS regarding this variation. However, advice was provided by Richard Chase, Combustion Sector Lead, and Cathal O'Leary, the site's lead regulatory officer, regarding the LCP aspect of this variation.

4 Form Part C2: Q2b – Changes to existing activities

See **Table 1** below.

Table 1 – Changes to existing activities

Name	Installation Sch 1 reference	Description of the installation activity	Proposed changes document reference
Scunthorpe Integrated Iron & Steelworks Activity AR1	1.1 A(1)(a)	Burning any fuel in an appliance with a rated thermal input of 50 MW or more	Variation to activity See section 9.1
Scunthorpe Integrated Iron & Steelworks Activity AR32	2.1 A(2)(c)	Applying protective fused metal coatings with an input of more than 2 tonnes of crude steel per hour	New Part A2 activity See section 9.1.

5 Form Part C2: Q3b – Technical Ability

The processes subject to this variation application are neither Specified Waste Management Activities nor waste operations. Question 3b does not apply.

6 Form Part C2: Q3d – Environmental management system

British Steel operates an environmental management system certified to be in accordance with the ISO14001:2015 standard. The management system consists of policies, procedures and records held both as hard copies and as soft copies in electronic databases accessible to relevant role holders across the British Steel business.

A copy of British Steel's ISO14001:2015 certificate can be found in Appendix 1 .

The British Steel management system operates at all levels of the organisation. Core EMS requirements such as the environmental policy, aspects and impacts register, details of the context of the organisation, including an assessment of environmental risks and opportunities along with the other elements that would be expected from a certified management system are developed and implemented by the central Environment Department and top management. They are available to all internal interested parties within British Steel via a company-wide database.

This database also contains records of management reviews and those objectives and targets, procedures, associated work instructions and records necessary to enable us to manage our environmental aspects and to continually improve the broader environmental performance of our organisation.

Complaints response is managed through the EMS by the central Environment Department, who work with individual plant areas to identify and address public concerns when they are raised.

Operational control is managed at a plant level, with the Energy Operations and Scunthorpe Rail & Section Mill (SRSM) departments having their own internal procedures that control day-to-day activities both in terms of production, quality, health and safety, environment and any other relevant requirements.

Energy Operations control the permitted combustion processes at Central Power Station (CPS) and the Turbo Blower House (TBH), which comprise the three site LCPs. SRSM controls the rail coating "Zinoco" process in the Rail Service Centre.

Plant engineering teams use electronic engineering management systems to ensure that preventative maintenance required for infrastructure and environmentally critical equipment is undertaken at the required frequencies.

The Scunthorpe works is a complex installation and all drawings and infrastructure plans are maintained and managed by the drawing office and civil engineers responsible for the design, operation and maintenance of the relevant infrastructure.

As an upper tier COMAH site, emergency planning is subject to regulatory supervision by the COMAH Competent Authority. An in-house emergency service is delivered by Humberside Fire & Rescue Service, who regularly undertake exercises to ensure that British Steel is able to respond effectively to significant accidents or incidents within the installation.

7 Form Part C2: Q5a – Site plans

The site plan included within Schedule 7 of the current permit remains unchanged.

The locations of the LCPs (A201, A202 and A203) are as specified in Table S3.0.

Figure 1 shows the location of the Part A2 zinc-coating activity within the installation boundary (the white line).

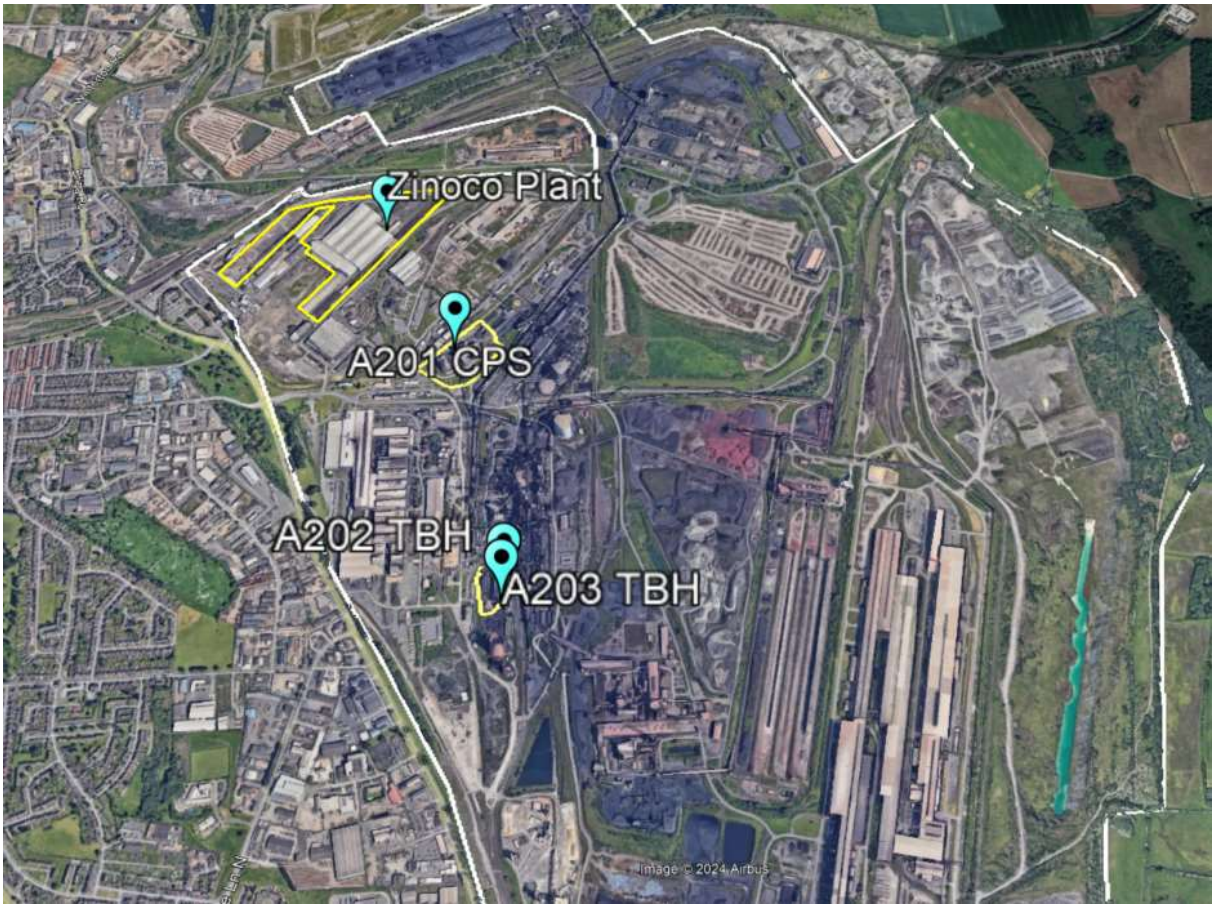

Figure 1: Location of Zinoco Plant and LCP stacks within the installation (white boundary). (© Google Earth, 2024).

The extract from the site drainage plan in Figure 2 shows the layout of local surface water drains around the Zinc-coating plant. There is no drainage in the immediate vicinity of the activity. Surface water from the southwestern part of SRSM Area 3 drains via a series of old ironstone quarry catchment pits before ultimately being discharged to Brumby Beck at emission point W1.

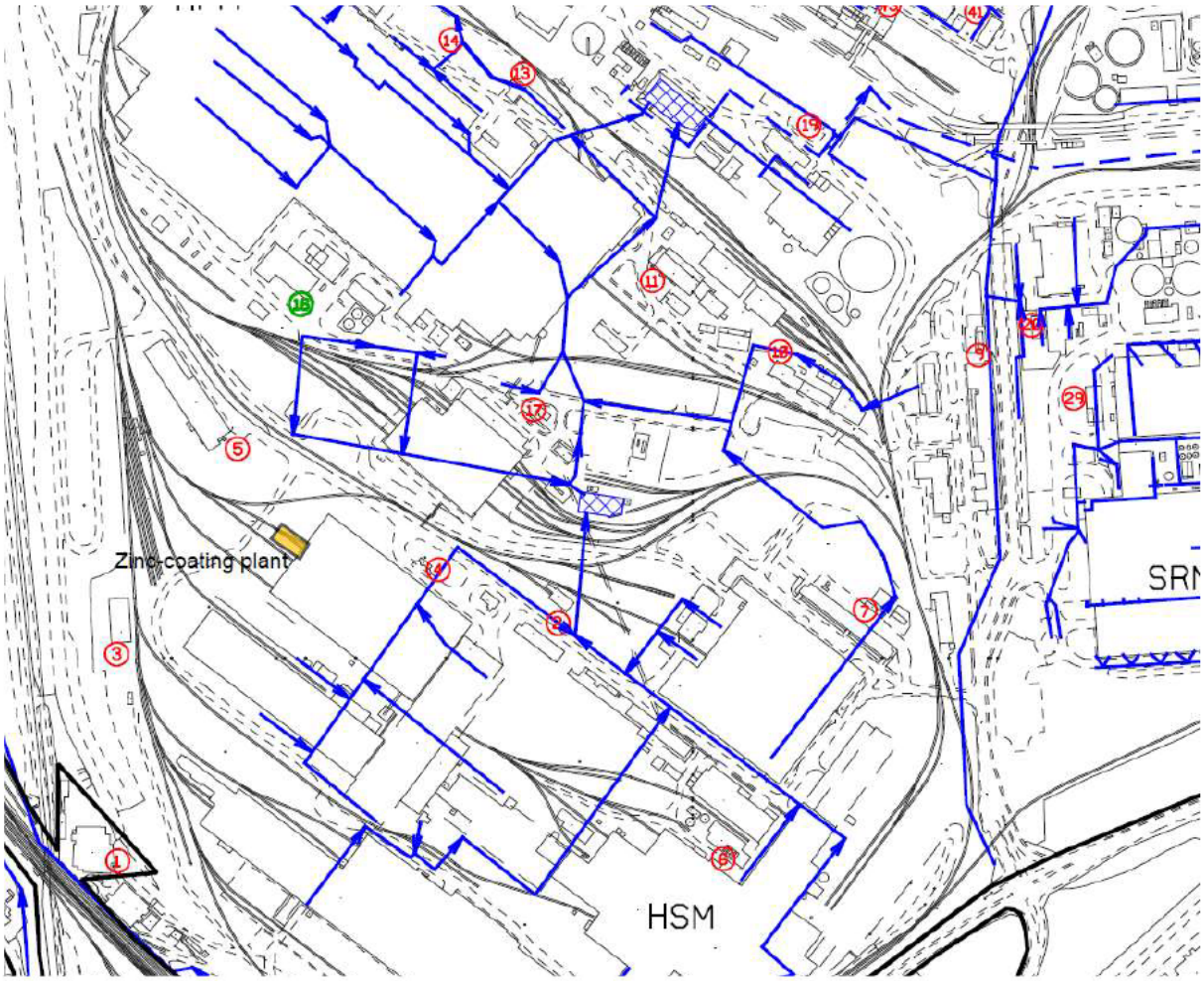

Figure 2: Local surface water drainage plan

8 Form Part C2: Q5c – Non-technical summary

8.1 Large Combustion Plant (LCP) fuel change

British Steel ceased cokemaking at Appleby Coke Ovens in June 2023. As a result, coke oven gas (COG) is no longer produced at Scunthorpe integrated iron and steelworks.

Integrated steelworks have traditionally utilised works arising gases from cokemaking, blast furnace and basic oxygen steelmaking operations to fuel many of the works' core manufacturing processes, including raising steam and providing blast air through the Turbo Blower House.

COG, the most calorific of the works arising gases, has therefore been replaced as a fuel in the site's LCPs by a synthetic COG (SCOG) comprising a blend of 2 parts natural gas (NG) to 1 part blast furnace gas (BFG).

This part of the application relates to changing the Raw Materials specified in Table S2.1 of the works environmental permit to replace COG with Natural Gas, from which SCOG is produced. This change will affect LCPs 341, 342 and 343.

It is necessary to review the limits currently applied through Table S3.6 to ensure that these align with the appropriate BAT-AELs for the fuel configuration of these LCPs. This is discussed in detail in section 11.1.

8.2 Zinc-coating process in Scunthorpe Rail and Section Mill

This activity was previously applied for in V004 but was withdrawn as a result of discussions with the Environment Agency, due to the complexity of that particular variation. However, it is necessary to add this activity in order to regularise operations around the rail mill's Zinc-coating activity.

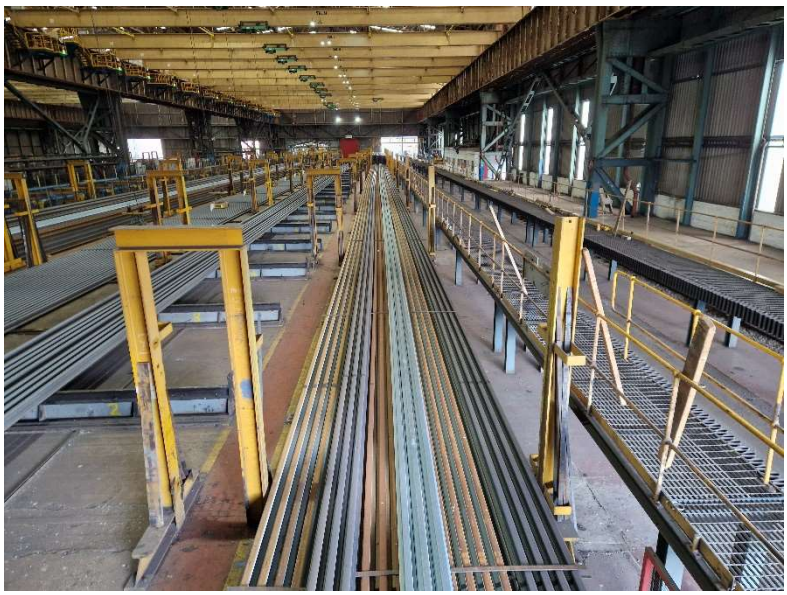

Figure 3: SRSM Area 3 rail service centre

British Steel has been operating a small-scale production line for zinc-coated rail for some time. However, the capacity of the original line was below the required threshold to require permitting as a Schedule 1 activity by virtue of Section 2.1 A(2)(c) of EPR 2016.

Following a successful introduction to the market, a full-scale production line was developed at the end of Scunthorpe Rail and Section Mill (SRSM) Area 3 (known as the Rail Service Centre or RSC). The plant runs as a batch operation dependant on customer demand for the zinc-coated rail product. It only operates during day shifts.

The process consists of five stages:

1. Manual degreasing
2. Grit blasting
3. Spray coating
4. Sealant application
5. Curing prior to storage and despatch.

A flow diagram of the process is presented in Figure 4. The Zinc-coating process is capable of coating 5.25 MT of steel per hour.

8.2.1 Degreasing

Rail is fed into the degreasing stand at a rate of 3 metres per minute, at which point a proprietary alkaline alcohol-based degreaser is manually applied by brush to remove any excess surface grease that may have accumulated on the rail's surface during prior handling. The degreaser is removed using rags, which are disposed of as waste.

8.2.2 Grit blasting

Steel shot is used to remove any residual degreaser and other surface defects prior to the spray coating process. Contaminated air from the grit blasting process is extracted by a fan operating at 10,200m^3/hr and passed through a dust collector.

Treated air is emitted via a new emission point A133 (SRSM Area 3 Grit Blaster).

The collected dust, which consists of steel from the shot and the surface treatment of rail, is collected in a bag beneath the dust collector and is recycled alongside the used shotblast material via the steelmaking plant.

8.2.3 Spray booths

Once the surface of the rail has been cleaned, the rail moves through a series of two spray booths.

In spray booth 1 a zinc/aluminium wire is arc heated and sprayed onto the moving rail from two pistols either side of the track, in order to achieve the desired coverage.

Air is extracted via ducting from two sides of the booth at a rate of 10,687 m^3/hr, after which the air is treated by a cyclone filter (see Figure 8) to drop heavy particles from the airstream prior to it passing through a Donaldson Torit DCE dust collector (see Figure 7).

Spray booth 2 acts identically, but the application guns are located above and below the rail rather than at either side, ensuring uniform coverage of the rail product. An identical extraction system is in place, running through a parallel cyclone and dust collector arrangement of the same specification.

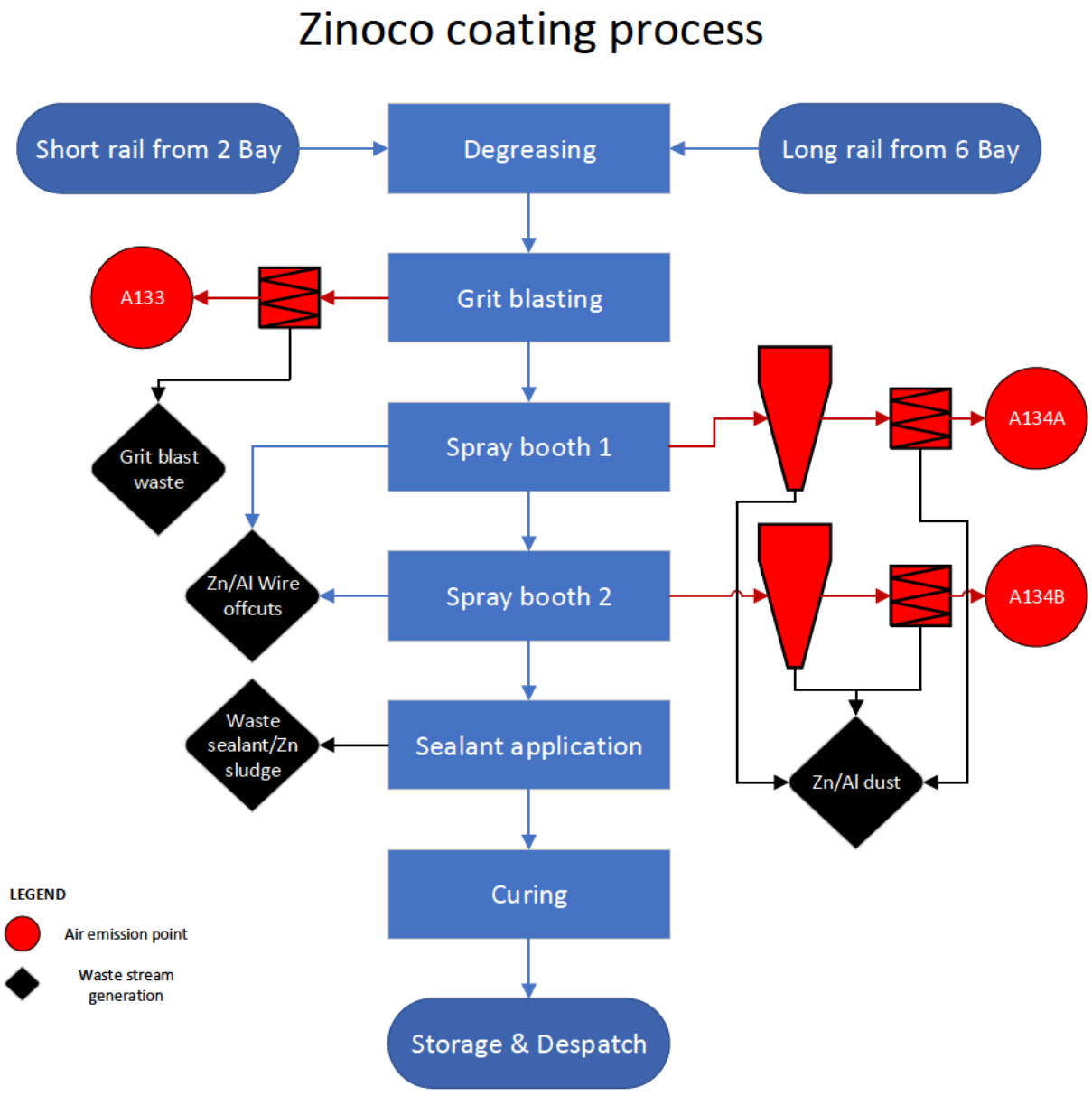

Figure 4: Zinc-coating process flow diagram

Figure 5: Spent steel shot from grit blasting

Figure 6: Dust collector for grit blaster

Figure 7: Spray booth 1 dust collector and emission stack A134a

Figure 8: Cyclone filters for spray booth 1 (left) and 2 (right)

Collected dust from the spray booths is stored in sealed UN bags pending recycling at a suitably permitted hazardous waste management facility. The bags are kept inside a dedicated waste compound within the Rail Service Centre, where they are held on an impermeable surface and protected from weather, as can be seen in Figure 9.

Figure 9: Hazardous waste storage area

Around 45-50 tonnes of zinc-aluminium fume waste is sent for recycling each year.

8.2.4 Sealant addition

After spraying, coated rail is passed over a run out track where a proprietary water resistant sealant is applied to the metal's surface. The sealant is a non-hazardous product.

Drips from the finished rail are collected in containers beneath the run out track and, where possible, this captured sealant is filtered and reused.

Once finally spent the waste sealant, which contains some zinc residues, is decanted into an IBC, which is stored in a secure lockable IBC bund adjacent to the plant building pending off-site disposal via a hazardous waste transfer station. The quantity of waste generated is very low (<200 kg per year).

8.2.5 Curing and storage

Once sealant has been applied, rail is moved out onto the external storage racking for curing. It is necessary to cure treated rail for at least two weeks prior to it being suitable for use.

After curing, rail will either be despatched to the customer or will be moved to an appropriate stock holding area.

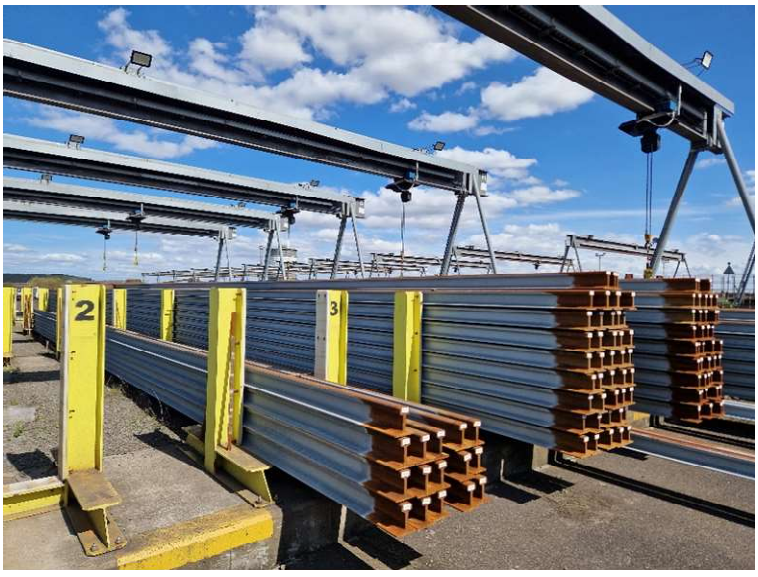

Figure 10: Curing and storage of treated rail products

The end of treated rail products are generally left untreated, as can be seen in Figure 10. This allows for different lengths of rail to be welded together. This rail is then coated in the field using a specialist zinc paint product, which is outside the scope of the Part A(2) activity.

8.2.6 Other process waste

Wastes arising from the activity are detailed in section 19.

9 Form Part C2: Q6 – Environmental risk assessment

An environmental risk assessment has been undertaken with respect to the Zinc-coating activities in accordance with the British Steel risk assessment methodology detailed in Table 1. The risk assessment findings are presented in Table 2. The risk assessment rates the unmitigated likelihood and consequence of the risks.

Table 1: British Steel environmental risk assessment Likelihood v Consequence matrix

Consequence		1 Slight/Minor	2 Moderate	3 Major	4 Catastrophic
Definition		Isolated, on-site (e.g. pollution of internal water systems requiring limited response, exceedance of an AQS, breach of waste protocol, community complaint. Reportable event.	Limited, on-site (e.g. affects close to effluent discharge point (thin oil sheen) or plant water use, >3 days effect on air quality, land pollution, reversible impact on ecology, >3 or recurring community complaints. Recurring or significant breach of permit limit. Competent authority issue written warning. Reportable event.	Significant, localised (on or off-site) e.g. affects >200m stretch of water (rainbow for oil), significant deterioration of air quality, land pollution preventing use, loss of ecology, prolonged impact on community or aesthetic / access. Risk of prosecution for competent authority. Local press. Reportable event.	Irreversible, persistent (>7 days) or extensive impact. E.g. affects 1-2 km stretch of water, fish kill, sustained exceedance of AQS, land pollution preventing use requiring remediation, adverse effect on statutory protected site/species, widespread impact on community or suspension of amenity access. Competent Authority serve notice. National press.
5 **Certain**	It will happen again soon	Low	Medium	High	Critical
4 **Likely**	It will reoccur but not as an everyday event	Low	Medium	High	Critical
3 **Possible**	It may occur from time to time	Low	Medium	High	High
2 **Unlikely**	Not expected to happen again in the foreseeable future	Minimal	Low	Medium	High
1 **Rare**	So unlikely that it is not expected to happen again	Minimal	Low	Medium	High

Table 2: Zinoco Plant Environmental Risk Assessment findings

Process	Aspect type	Aspect description	Normal operation	Abnormal operation	Emergency situation	Consequence	Likelihood	Risk rating	Permit or regulations apply	Severity	Req. control
Grit blasting	Air	Emission of extracted air	Yes	Yes	Yes	Moderate	Certain	10	Yes	Medium	Yes
Spray booths	Air	Emission of extracted air	Yes	Yes	Yes	Moderate	Certain	10	Yes	Medium	Yes
Spray booths	Waste	Used air filter cartridges	Yes	Yes	Yes	Moderate	Certain	10	Yes	Medium	Yes
Spray booths	Waste	Zn/Al dust waste	Yes	No	No	Moderate	Certain	10	Yes	Medium	Yes
All stages	Air	Fire incident (smoke)	No	No	Yes	Major	Unlikely	6	No	Medium	Yes
Spray booths	Land / groundwater	Ground contamination or runoff resulting from Zn/Al waste storage	No	No	Yes	Moderate	Possible	6	Yes	Medium	Yes
Degreasing	Raw materials	Use of degreaser	Yes	Yes	No	Slight/Minor	Certain	5	No	Low	No
All stages	Energy	Building lighting	Yes	Yes	Yes	Slight/Minor	Certain	5	No	Low	No
Degreasing	Waste	Empty contaminated packaging	Yes	Yes	Yes	Slight/Minor	Certain	5	Yes	Low	Yes
Grit blasting	Raw materials	Use of iron shot	Yes	Yes	Yes	Slight/Minor	Certain	5	No	Low	No
Grit blasting	Energy	Grit blaster power consumption	Yes	Yes	No	Slight/Minor	Certain	5	No	Low	No
Grit blasting	Community (Noise, vibration, odour & visual amenity)	Noise from grit blaster operation	Yes	Yes	No	Slight/Minor	Certain	5	Yes	Low	Yes
Degreasing	Waste	Used absorbents c/w grease	Yes	Yes	Yes	Slight/Minor	Certain	5	Yes	Low	Yes
Grit blasting	Waste	Spent iron shot	Yes	No	No	Slight/Minor	Certain	5	Yes	Low	Yes
Spray booths	Raw materials	Use of Zn/Al wire	Yes	Yes	No	Slight/Minor	Certain	5	Yes	Low	Yes
Spray booths	Raw materials	Use of wire lubricant and white spirit	Yes	No	No	Slight/Minor	Certain	5	Yes	Low	Yes
Spray booths	Community (Noise, vibration, odour & visual amenity)	Noise from pneumatics and fans	Yes	Yes	Yes	Slight/Minor	Certain	5	Yes	Low	Yes
Spray booths	Waste	Zn/Al wire offcuts	Yes	No	No	Slight/Minor	Certain	5	Yes	Low	Yes
Sealant application	Raw materials	Use of sealant	Yes	Yes	No	Slight/Minor	Certain	5	Yes	Low	Yes
Sealant application	Land / groundwater	Previseal tank	Yes	Yes	Yes	Slight/Minor	Certain	5	Yes	Low	Yes

Process	Aspect type	Aspect description	Normal operation	Abnormal operation	Emergency situation	Consequence	Likelihood	Risk rating	Permit or regulations apply	Severity	Req. control
Sealant application	Land / groundwater	Storage of sealant containers	Yes	Yes	Yes	Slight/Minor	Certain	5	Yes	Low	Yes
Sealant application	Waste	Empty contaminated packaging	Yes	Yes	Yes	Slight/Minor	Certain	5	Yes	Low	Yes
Sealant application	Waste	Zn-contaminated sealant sludge	Yes	No	No	Slight/Minor	Certain	5	Yes	Low	Yes
Labelling and storage	Raw materials	Use of labels	Yes	No	No	Slight/Minor	Certain	5	Yes	Low	Yes
Labelling and storage	Raw materials	Use of virgin timber	Yes	No	No	Slight/Minor	Certain	5	No	Low	No
Labelling and storage	Community (Noise, vibration, odour & visual amenity)	Hoist alarm	Yes	Yes	No	Slight/Minor	Certain	5	Yes	Low	Yes
Labelling and storage	Community (Noise, vibration, odour & visual amenity)	FLT reversing alarms	Yes	Yes	Yes	Slight/Minor	Certain	5	Yes	Low	Yes
All stages	Water	Chemical spill incident	No	No	Yes	Moderate	Unlikely	4	No	Low	No
All stages	Water	Flood resulting in loss of hazardous substances	No	No	Yes	Moderate	Rare	2	Yes	Low	Yes

9.1 Risk management

British Steel's zinc-coating process is comparatively small, and risk assessment shows the environmental risks posed by the operation to be generally low, when scored in accordance with the company's risk assessment methodology. However, if unmitigated the potential environmental impacts identified in Table 3 require additional management to ensure that they achieve a low risk rating.

Table 3: Significant environmental risks

Process	Aspect type	Aspect description	Normal operation	Abnormal operation	Emergency situation	Severity
Grit blasting	Air	Emission of extracted air	Y	Y	Y	Medium
Spray booths	Air	Emission of extracted air	Y	Y	Y	Medium
Spray booths	Waste	Used air filter cartridges	Y	Y	Y	Medium
Spray booths	Waste	Zn/Al dust waste	Y	N	N	Medium
All stages	Air	Fire incident (smoke)	N	N	Y	Medium
Spray booths	Land / groundwater	Ground contamination or runoff resulting from Zn/Al waste storage	N	N	Y	Medium

Air emissions from the grit blaster and spray booths are managed through the operation and maintenance of filtration systems on the local exhaust ventilation systems. Routine maintenance and filter changes by qualified extraction system maintenance engineers ensure that these units remain functioning at the required standard, and future periodic monitoring will be implemented on these emissions in accordance with PGN 6/35 to ensure ongoing compliance with BAT-AELs.

All hazardous wastes arising from the activities are stored in appropriate water resistant containers within the hazardous waste storage area inside the Rail Service Centre building, on impermeable concrete surfacing and protected from the weather. Waste is removed by a registered waste carrier to a permitted waste management site when a full load is ready for collection. Zn/Al dust waste is recycled into the zinc industry. Filter cartridges are submitted for energy recovery via a hazardous waste transfer station.

Fire risks are managed in accordance with British Steel's health and safety management system requirements. On-site emergency response is provided by

Humberside Fire & Rescue Service in the event a fire were to break out within the coating plant.

10 Form Part C3: Q1 – What activities are you applying to vary?

Details of the activities it is proposed to vary are included in **Table 1a**.

Table 1a

Schedule 1 listed activities						
Installation name	Schedule 1 references	Description of the activity	Activity capacity	Annex I & II codes	Haz waste treatment capacity	Non-haz waste treatment capacity
Scunthorpe Integrated Iron & Steelworks Activity AR1	1.1 A(1)(a)	Burning any fuel in an appliance with a rated thermal input of 50 MW or more	Total rated thermal input 452 MWth LCP341: 216 MWth LCP342: 56 MWth LCP343: 180 MWth	NA	NA	NA
Scunthorpe Integrated Iron & Steelworks Activity AR32	2.1 A(2)(c)	Applying protective fused metal coatings with an input of more than 2 tonnes of crude steel per hour	3.2 MT/h	NA	NA	NA
Directly associated activities						
Name of DAA		Description of the DAA (please identify the schedule 1 activity it serves)				
NA		NA				
For installations that take waste		Total storage capacity (tonnes)				NA
		Annual throughput (tonnes each year)				NA

11 Form Part C3: Q2 – Point source emissions to air, water and land

The installation has a large number of authorised point source emissions to air and water. Most are unaffected by this variation application. Table 2 has been completed for those air emission points relevant to this variation only.

Table 2

Installation name	Scunthorpe Integrated Iron & Steelworks			
Point source emissions to air				
Emission point reference and location	Source	Parameter	Quantity	Unit
LCP341 A201 SE 9136 1092	CPS Boiler 1 & 2 Outlet Ducts 1 & 2	Sulphur dioxide	See section 11.1	mg/Nm^3
		Oxides of Nitrogen as NO_2		mg/Nm^3
		Particulates		mg/Nm^3
LCP342 A202 SE 9158 1016	Turbo Blower House Boilers 1 – 4 Outlet Ducts 1 - 4	Sulphur dioxide		mg/Nm^3
		Oxides of Nitrogen as NO_2		mg/Nm^3
		Particulates		mg/Nm^3
LCP343 SE 9158 1008	Turbo Blower House Boilers 5 – 5 Outlet Ducts 6 - 6	Sulphur dioxide		mg/Nm^3
		Oxides of Nitrogen as NO_2		mg/Nm^3
		Particulates		mg/Nm^3
A133 SE 91105 11369	SRSM Area 3 Grit blaster	Particulates	20	mg/Nm3
A134a SE 91098 11358	Zinc-coating spray booth 1	Particulates	20	mg/Nm^3
		Total Zinc	No limit proposed	mg/Nm^3
A134b SE 91096 11359	Zinc-coating spray booth 2	Particulates	20	mg/Nm^3
		Total Zinc	No limit proposed	mg/Nm^3

Point source emissions to water, land or sewer				
No change to existing emission points				

11.1 LCP emission limit values (elvs)

British Steel has calculated proposed elvs based on the provisions of Article 40 and Annex V of the Industrial Emissions Directive.

All elvs are calculated at standard reference conditions of 273.15K, 101.3 kPa at 3% oxygen, dry gas.

11.1.1 Gaseous fuel

The three LCPs operating at British Steel Scunthorpe were originally designed to operate on a fuel mix derived primarily from coke oven gas (COG). With the cessation of cokemaking at the Scunthorpe works, the plants now run on a fuel referred to as synthetic coke oven gas (SCOG), which comprises of natural gas (NG) and blast furnace gas (BFG) in a target ratio of 2:1.

Whereas previous elvs were fixed and based on COG, LCP-compliant SCOG elvs are calculated in accordance with the methodology described in Article 40 of the Industrial Emissions Directive (i.e. they are fuel-weighted based on the thermal input delivered by each fuel).

As BFG delivers less than 5% of the fuel's thermal input, the new elvs associated with SCOG are significantly lower than the current elvs, more closely reflecting the elvs of natural gas.

Table 4 details the emission limit values defined for the relevant gaseous fuels in Annex I, Part 2, section 2 of the Industrial Emissions Directive.

Table 4: LCP monthly mean elvs for relevant gaseous fuels in Scunthorpe's LCPs

Total rated thermal input (MW)	SO_2 elv (mg/Nm^3)	NO_x elv (mg/Nm^3)	Dust elv (mg/Nm^3)
Natural gas	35	100	5
Blast furnace gas	200	300	10

Emission limit values for daily means are as described in Table 4, plus 10%

Emission limit values for hourly means are as described in Table 4, plus 100%

11.1.1.1 Consideration of fixed versus variable limits for SCOG

Whilst SCOG is targeted to a 2:1 ratio of NG to BFG, there is a an element of variability in this mixture, though this is tightly controlled. Article 40 of the IED suggests that a variable limit should therefore be applied to account for the variation in composition of the supplied fuel gas.

In theory, this should be fairer on British Steel as the limit will reflect site activities during a given period.

However, analysis of the site's 2023 fuel mix data (supplied in Appendix 2) and subsequent calculation of the associated emission limit values suggest that the adopting a variable limit will not offer any notable benefit to either the operator or to the environment.

During 2023 the minimum percentage of BFG in the fuel blend was 29.19%, whilst the maximum was 33.55%. Notwithstanding this, statistical analysis shows that the consistency of the gas blend is very high overall, as illustrated in Table 5.

Table 5: Statistical indicators of 2023 Scunthorpe SCOG composition dataset

Statistical indicator	
Mean BFG	33.122 %
Maximum BFG	33.549 %
Minimum BFG	29.187 %
10%ile BFG	32.773 %
Standard deviation BFG	0.418 %

Blast furnace gas has a substantially lower net calorific value (NCV) when compared to natural gas. At Scunthorpe, BFG has a NCV of 3.51633 MJ/m^3, compared to 37.50433 MJ/m^3 for imported NG (NG figure based on Government factors). As a result, small fluctuations in the proportion of BFG in the SCOG mix make only very minor impact on the elvs calculated using the Article 40 method.

As illustrated in Table 6, fluctuations throughout the entire year would only have the most inconsequential impact upon the level of the various elvs, with variation that is well within the margin of error associated with the continuous dust, NO_x and SO_2 monitoring equipment.

Table 6: Differences in Article 40-derived elvs for SCOG based on the 2023 fuel composition dataset

% BFG in SCOG	SO_2 elv (mg/Nm^3)	NO_x elv (mg/Nm^3)	Dust elv (mg/Nm^3)
2023 Mean (33.122 %)	42.32	108.87	5.22
2023 Maximum (33.549%)	42.46	109.04	5.23
2023 Minimum (29.187%)	41.14	107.44	5.19
2023 10%ile (32.773)	42.21	108.74	5.22

British Steel considers that adopting a variable limit based on fuel blend would necessitate additional data handling and interpretation that is disproportionate to any environmental benefit gained and, therefore, it would be more sensible and transparent for members of the public to adopt fixed limits based on the 10^{th}-percentile value for 2023 blast furnace gas concentration (i.e. 90^{th}-percentile natural gas concentration). This offers a conservative elv whilst excluding outlying results that are unrepresentative of normal operating conditions.

To allow for rounding to the nearest sensible whole number, it is therefore proposed that the emission limit values for SCOG at reference conditions be fixed as those provided in Table 8, below.

11.1.2 Liquid fuel

It is frequently necessary to operate the LCPs on supplementary heavy fuel oil (HFO). This occurs when there is insufficient SCOG available due to a lack of BFG, usually during periods when one or more blast furnaces is producing insufficient gas pressure. HFO use results in SO_2 and dust emission which are in excess of the elvs associated with SCOG.

It is not possible to monitor the emissions associated with gaseous and liquid fuels separately as they are emitted via the same stacks.

HFO is an expensive supplementary fuel and its use is always minimised on economic as well as environmental grounds. Maintaining stable production at the blast furnaces is the critical factor in minimising HFO use.

The elvs associated with the combustion of HFO are provided in Annex I, Part 2, section 2 of the Industrial Emissions Directive, a table from which is reproduced in Table 7.

Table 7: LCP monthly mean elvs for HFO in Scunthorpe's LCPs

Total rated thermal input (MW)	SO_2 elv (mg/Nm^3)	NO_x elv (mg/Nm^3)	Dust elv (mg/Nm^3)
50-100	350	300	20
100-300	200	150	20
> 300	150	100	10

Emission limit values for daily means are as described in Table 7, plus 10%

Emission limit values for hourly means are as described in Table 7, plus 100%.

At Scunthorpe, LCP 341 (Central Power Station) and LCP 343 (Turbo Blower House boilers 5 and 6) each have thermal inputs of between 100 and 300 MW, whereas LCP 342 (Turbo Blower House boilers 1-4) has a thermal input of 50-100 MW. Therefore, the emission limits that should apply to the two TBH LCPs would be different, despite the two LCPs having a common Control Room, liquid fuel supply and being operated interchangeably.

However, it is not practically feasible for the TBH control room to differentiate between liquid fuel supplied to the boilers 1-4 and the boilers 5-6, which would be necessary to calculate the associated thermal input to each LCP in a mixed-fuel scenario.

Therefore, in the interest of simplicity, consistency and practicality, it is proposed to adopt the more stringent 100-300 MW limits on all three of the Scunthorpe LCPs when they are solely burning HFO.

11.1.3 Proposed limits

British Steel proposes that the emission limit values at the three Scunthorpe LCPs during a given compliance period vary based on one of the three scenarios:

- Gaseous (SCOG) fuel only
- Liquid (HFO) fuel only
- Alternating gaseous and liquid fuels.

The proposed limits associated with each scenario are set out below.

11.1.3.1 SCOG-only operation

During compliance periods (i.e. monthly, daily, hourly) when the LCPs are combusting only SCOG, it is proposed that the elvs shall be those specified in Table 8.

Table 8: Proposed elvs associated with combustion of SCOG in the Scunthorpe LCPs

Proposed elvs (mg/Nm³)	SO_2 elv (mg/Nm³)	NO_x elv (mg/Nm³)	Dust elv (mg/Nm³)
Monthly mean	42	108	5
Daily mean	46	119	5.5
Hourly mean	84	216	10

11.1.3.2 HFO-only operation

During compliance periods (i.e. monthly, daily, hourly) when the LCPs are combusting only HFO, it is proposed that the elvs shall be those specified in Table 9.

Table 9: Proposed elvs associated with combustion of Heavy Fuel Oil or other liquid fuel in the Scunthorpe LCPs

Proposed elvs (mg/Nm³)	SO_2 elv (mg/Nm³)	NO_x elv (mg/Nm³)	Dust elv (mg/Nm³)
Monthly mean	200	150	20
Daily mean	220	165	22
Hourly mean	400	300	40

11.1.3.3 Alternating gaseous and liquid fuels

Article 40 of IED makes provision for deriving limits for multi-fuel combustion plants based on fuel-weighted emission limits. This has been followed to derive a proposed set of emission limit values for SCOG, as described in section 11.1.1.

Whilst the text of Article 40 only refers to deriving limits for such plants involving the *simultaneous* use of two or more fuels (e.g. SCOG, which comprises natural gas and BFG), in the absence of an alternative mechanism to derive elvs for plants firing alternating fuels it is proposed to adopt the Article 40 methodology to derive appropriate hourly, daily and monthly limits for the three Scunthorpe LCPs during periods when SCOG is alternated with HFO.

A multi-fuel combustion plant is defined in Article 3 clause 32 as any combustion plant which may be fired simultaneously *or alternately* by two or more types of fuel. This scenario would therefore appear to be included within the wider definition and be within the spirit of the Directive.

As it is not possible to monitor the emissions from gaseous and liquid fuels separately, failure to incorporate HFO into the elv calculation would lead to disproportionately low elvs at times when it is necessary for the site's LCPs to operate on HFO.

British Steel therefore proposes that emission limit values for dust, NO_x and SO_2 at the Scunthorpe LCPs be derived for each reporting interval (i.e. hourly, daily, monthly) by applying the following formula:

$$Derived\ elv = \frac{(SCOG\ elv\ x\ SCOG\ thermal\ input)\ +\ (HFO\ elv\ x\ HFO\ thermal\ input)}{Total\ thermal\ input\ during\ reporting\ interval}$$

The SCOG and HFO elvs shall be the relevant elvs taken from Table 8 and Table 9 respectively.

12 Form Part C3: Q3a - Technical standards

The technical standards included in Table 10, below are considered to be of relevance to this application.

Table 10: Technical standards

Installation name	Scunthorpe Integrated Iron & Steel Works	
Description of the Schedule 1 activity or DAA	Best Available Technique (BATC, BREF or TGN reference)	Document reference (if appropriate)
1.1 A(1)(a) Burning any fuel in an appliance with a rated thermal input of 50 MW or more	BREF: Iron & Steel Production (2012)	NA
	BREF: Combustion (2018)	NA
2.1 A(2)(c) Application of fused coatings to metal products	Zinc and zinc alloys Surface treatment of metals Metal powder and other thermal spraying.	PGN 2/07 PGN 4/01 PGN 6/35

When considering appropriate emission limit values for the Zinc-coating Part A(2) activity, British Steel has reviewed published guidance with respect to Best Available Techniques in an effort to identify any applicable BAT-AELs.

No relevant guidance is available in the primary Iron and Steel or Ferrous Metal Processing BREFs that applies to the Zinc-coating activity at the Scunthorpe

installation. Therefore, Local Authority PPC Process Guidance Notes (PGNs) have been reviewed.

Having reviewed the three PGNs listed in Table 10, none state that they are directly applicable to a S2.1 A(2)(c) activity. However, in the absence of more appropriate guidance, British Steel proposes emission limits based on PGN 6/35 for Metal powder and thermal spraying, as this best describes the zinc-coating process undertaken at the site.

12.1 BAT assessment for LCPs

There is no change to the operating profile of the LCPs that would affect the current position with respect to BAT Conclusions. The BAT changes relating to emission limit values associated with changing fuels are addressed in section 11.1.

12.2 BAT assessment for the Zinc-coating process

British Steel reviewed Zinc-coating operations against the relevant standards specified in section 5 of PGN 6/35.

The results of this evaluation are presented in Table 11.

Table 11: Zinc-coating BAT assessment

BAT point	British Steel evaluation	Proposed improvement action
Abatement systems		
Particulate matter	**Compliant** Containment of grit blasting activity within the grit blasting machine and extraction via a dry filter. Spray booth enclosed and extracted via a cyclone and dry HEPA filter	None
Metal fume and metal dust from spraying and coating activity	**Compliant** Containment of activity within spray booth with extraction via a cyclone and dry HEPA filter	None
Dispersion & dilution	**Compliant**	None

BAT point	British Steel evaluation	Proposed improvement action
	A D1 stack height assessment is not required as the emission is solely of particulate matter.	
Others		
Ambient air quality management	**Compliant** Whilst the local area has been declared an AQMA for PM10, it is not considered appropriate to implement lower limits than the BAT-AEL for this particular process.	None
Stacks, vents and process exhausts	**Compliant** The spray booth emission points A134a and A134b are fitted with jet cowls to reduce the risk of moisture ingress. The A133 filter unit is also protected from water ingress. The extraction systems and ductwork are subject to routine cleaning and servicing by a qualified maintenance engineer. Duct flow velocities in all systems are 15 m/s and above.	None
Management techniques	**Compliant** Management systems are discussed in section 6.	None

BAT point	British Steel evaluation	Proposed improvement action
	Critical spares for the Zinc-coating plant are held in stores.	
Training	**Compliant** All personnel with tasks and duties relevant to the operation of the Zinc-coating activity are trained and competent for their roles, including the requirement to operate the abatement equipment and how to manage hazardous substances. British Steel's training management system includes those activities relevant to this process.	None

13 Form Part C3: Q3a1 - Changes to operating techniques

The text in section 2.3.22 of the application dated 30 August 2001, referenced in Table S1.2 row 1, shall be replaced with the text in Appendix 3 of this application.

14 Form Part C3: Q3b – General requirements

14.1 Emissions management

If the technical guidance or your risk assessment shows that emissions of substances not controlled by emission limits are an important issue, send us your plan for managing them

Emissions of substances not controlled by emission limits are not considered to be an important issue relevant to this application.

14.2 Noise and vibration

If the technical guidance or your risk assessment shows that noise or vibration are important issues, send us your noise or vibration management plan (or both)

The environmental risk assessment for this process, detailed in section 9, has not deemed noise to be a significant issue with respect to this application.

No additional plans to those already included in the installation's management systems are necessary to manage this risk.

15 Form Part C3: Q3c – Types and amounts of raw materials

15.1 Zinc-coating plant raw materials

The raw materials listed in Table are used as part of the Zinc-coating activity.

Name of the installation	Scunthorpe Integrated Iron and Steelworks AR32 Zinc-coating line
Capacity	3.2 tonnes of rail per hour

Schedule 1 activity	Raw material description	Max. amount on site at any one time	Annual throughput (T/a)	Main hazards
1.1 A(1)(a)	Synthetic coke oven gas (SCOG)	NA	Production dependent	NA – fuel gas
	Natural gas	NA	Production dependent	NA – fuel gas
	Heavy fuel oil	4,000 T at CPS 1,150 T at TBH	Production dependent	NA – fuel gas
2.1 A(2)(c)	Steel grit blast media	400 kg	10	-
	Zinc/aluminium wire	24 000 kg	100	-
	Alkaline degreaser	400 kg	1	Eye irritant
	Adhesive sealant	400 kg	1	-
	Wire lubricating oil	60 kg	1	Flammable

16 Form Part C3: Q4a – Monitoring

16.1 LCPs

The application does not propose to alter the current monitoring arrangements associated with the LCPs.

16.2 Zinc-coating plant

Table 4.1 of PGN 6/35 specifies that the only parameter that should be subject to emission limit values should be particulate matter, upon which a limit of 20 mg/m^3 should be applied. There is no additional requirement for emission limit values to control the concentration of zinc; this metal is not listed as one of those that should be subject to additional control.

Notwithstanding this, it is proposed to undertake monitoring for zinc for the information purposes. Monitoring will be undertaken annually.

A review of the stack configurations at A133, A134a and A134b has been undertaken by British Steel's MCERTS-accredited monitoring contractor, who have been requested to provided confirmation of any works necessary to enable MCERTS-compliant monitoring to be undertaken.

Any necessary works will be completed prior to the first monitoring exercise pursuant to the new permit.

17 Form C3: Q6a-6c - Energy and climate change

This variation will not result in a change in energy used at the Scunthorpe site compared to that previous authorised, though the fuel mix consumed in the site's LCPs will change.

British Steel operates an energy reduction programme under the direction of the business's Energy and Fuel Department. This department is also responsible for maintaining ESOS compliance.

With respect to Climate Change Levy Agreements, the company does not have a CCA covering Scunthorpe operations as this installation is subject to the exemption from climate change levy for metallurgical processes detailed in paragraph 3.14 of Excise Notice CCL1/3 Climate Change Levy — reliefs and special treatments for taxable commodities.

The Zinc-coating activity is a low consumer of energy, with the primary energy use being associated with the grit blaster, operation of the spray coating arc heating system and 11kW fan sets on the three extraction systems. These only operate during production and are subject to routine maintenance by the original equipment manufacturer to ensure that they operate efficiently.

18 Form C3: Q6d – Raw materials, substances and water use

There will be no change in the site's water consumption as a result of the changes requested within this variation. Details relating the raw materials and substances used are provided below.

18.1 LCPs

Table 12 summarises the changes required to Table S2.1 of the current permit.

Natural gas shall be added, as this forms part of the blended SCOG that powers the LCPs. No specification is required for natural gas as this is subject to the National Grid specification.

It is proposed to remove coke oven gas from Table S2.1 as COG is no longer burned at the coke ovens. Similarly, waste oil can also be removed as coke oven coal blend density control using this material is no longer undertaken on the site.

Table 12: Amendments to Table S2.1

Table S2.1 Raw materials and fuels	
Description	**Specification**
Natural gas	None
~~Coke oven gas (COG) for combustion)~~	~~5000 mg/m3 as the daily mean (06:00 hours to 06:00 hours) of the hydrogen sulphide content of coke oven gas burned at the coke ovens~~
~~Waste or recovered oil for coke oven coal blend bulk density control~~	~~Oil for density control or recovered oil shall meet end of waste protocol criteria~~

18.2 Zinc-coating process

The coating process uses very limited quantities of raw materials, and the volumes consumed are directly related to the throughput of the plant.

Previously, a caustic degreasing bath was used to remove surface grease at the start of the process. However, this has now been replaced with a manual degreasing process using a hydrocarbon-based surfactant. No water is used in the coating process.

The degreasers and sealant chemicals used are proprietary brands for which safety data sheets can be provided on request. The current sealant has no hazard phrases, whilst the degreaser is a skin irritant but has no ecotoxic effects.

Non-toxic iron shot is used in the grit blaster following degreasing. This is procured in 25 kg sacks and consumed based on the throughput of the grit blaster.

Otherwise, the only raw materials include the zinc/aluminium wire that this arc heated and sprayed onto rails in the spray booths. This is stored in steel drums and is non-hazardous when in its original form.

Small quantities of white spirit and a wire lubricating oil supplied by the wire manufacturer are also used to ensure that wire runs freely through the arc heating pistols. This reduces the risk of wire sticking, which can lead to extra waste and rework should it occur during a coating cycle.

Plastic-coated paper labels are applied to each end of a coated rail following curing, as per customer requirements. No additional packaging is applied to the finished product.

19 Form C3: Q6e – Waste

This variation will not impact on the waste profile of the combustion plants. However, the zinc-coating facility does produce the waste streams listed in Table 13.

All metal-bearing wastes from the process are recycled with the exception of contaminated filters, which are sent to a hazardous waste transfer station for onward management through an energy recovery process.

Table 13: Wastes from zinc-coating process

Waste stream	EWC code	R/D process	Approximate. quantity per annum	Notes
Zn/Al ('Zinoco') dust and wire offcuts	11 01 98*	R4	48,000 kg	Recycled through a UK-based zinc reprocessor
Zn/Al dust contaminated filters	15 02 02*	R13/R1	150 kg	Energy recovery via haz transfer station
Empty chemical containers	15 01 10*	R13	<50 kg	Sent to haz transfer station
Used absorbents c/w/ grease	15 02 02*	R13/R1	1000 kg	Energy recovery via haz transfer station
Spent iron shot	12 01 17	R4	Not available	Internally recycled via BOS plant
Zn-contaminated sealant sludge	11 01 09*	D15	1000 kg	Sent to haz transfer station

20 Form C3 Appendix 1 – Specific questions for the combustion sector

20.1 Fuel types

Installation reference	Scunthorpe integrated iron and steelworks LCP341, LCP342, LCP343		
Type of fuel	When run as normal	When started up	When shut down
Coal	×	×	×
Gas oil	×	×	×
Heavy fuel oil	✓	✓	✓
Natural gas	×	×	×
WID waste	×	×	×
Biomass	×	×	×
Landfill gas	×	×	×
Other	✓	✓	✓

As described earlier in this application, the Scunthorpe LCPs primary fuel is synthetic coke oven gas (SCOG) comprising 2 parts natural gas to 1 part blast furnace gas.

HFO is used as a fuel when insufficient SCOG is available to meet process demands.

20.2 Fuel composition

Give the composition range of any fuels you are currently allowed to burn in your combustion plant

Installation reference	Scunthorpe integrated iron and steelworks LCP341, LCP342, LCP343		
Parameter	Unit	SCOG	Heavy fuel oil
Maximum percentage of gross thermal input	%	LCP341 (CPS): 100% LCP342-3 (TBH): 10% (Nitrogen & Natural Gas. Pilots Only)	CPS: 60% TBH: 100%
Moisture	%		
Ash	% wt/wt dry		
Sulphur	% wt/wt dry		1.0

Installation reference	Scunthorpe integrated iron and steelworks LCP341, LCP342, LCP343		
Parameter	Unit	SCOG	Heavy fuel oil
Chlorine	% wt/wt dry		
Arsenic	% wt/wt dry		
Cadmium	% wt/wt dry		
Carbon	% wt/wt dry		
Chromium	% wt/wt dry		
Copper	% wt/wt dry		
Hydrogen	% wt/wt dry	0.114	
Lead	% wt/wt dry		
Mercury	% wt/wt dry		
Nickel	% wt/wt dry		
Nitrogen	% wt/wt dry	21.897	
Oxygen	% wt/wt dry	0.003	
Vanadium	mg/kg dry		
Zinc	mg/kg dry		
Net calorific value	MJ/kg	25.38 MJ/kg	42.60 MJ/kg

20.3 NO_x factors

British Steel undertakes continuous monitoring of the three LCPs and does not require NO_x factors for reporting purposes.

21 Form F1: Q1 – Working out charges

The relevant charge factors have been completed in the application form part F1.

The activity is within 10 km of a RAMSAR site and there are other nearby relevant SSSIs. Therefore, a habitats assessment fee has been included, alongside the variation fee for the LCP activity and a new permit charge for a Local Authority Part B installation.

Appendix 1 - Copy of ISO14001 certificate

Certificate GB05/66009

The management system of

British Steel Limited

Administration Building Brigg Road Scunthorpe North Lincolnshire DN16 1BP United Kingdom

has been assessed and certified as meeting the requirements of

ISO 14001:2015

For the following activities

Activities associated with British Steel Limited Iron and Steel Making including: Import, storage, transportation and use of bulk raw materials.

Processing of coke and the generation of by-products including coke oven gases.

The production of Iron and steel and final manufacture of Steel Sections, Rod, Rail and semi- finished products. Collection, recycling and final disposal of waste to landfill.

This certificate is valid from 07 May 2023 until 07 May 2026 and remains valid subject to satisfactory surveillance audits.

Issue 27. Certified since 07 May 1999

Certified activities performed by additional sites are listed on subsequent pages.

Authorised by
Jonathan Hall
Global Head - Certification Services

SGS United Kingdom Ltd
Rossmore Business Park, Ellesmere Port, Cheshire, CH65 3EN, UK
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Page 1 / 2

Certificate GB05/66009, continued

British Steel Limited

SGS

ISO 14001:2015

Issue 27
Sites
British Steel Limited Administration Building Brigg Road Scunthorpe North Lincolnshire DN16 1BP United Kingdom
British Steel Limited Darlington Whessoe Road Darlington DL3 0RG United Kingdom
British Steel Limited Skinningrove PO Box 1 Carlin How Saltburn by the Sea Cleveland TS13 4ET United Kingdom
British Steel Limited Teesside Beam Mill Lackenby Works Steel House Redcar Cleveland TS10 5QW United Kingdom
British Steel Limited Immingham Bulk Terminal Humber Road South Killinghorne DN40 3LZ United Kingdom

ISO 14001 SYSTEM CERTIFICATION SGS

UKAS MANAGEMENT SYSTEMS 0035

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

Page 2 / 2

Appendix 2 – 2023 Fuel compositional data

The SCOG emission limits proposed in section 11.1 are based on Scunthorpe works' 2023 SCOG blend information.

These data are included within this appendix.

24hrs to time	Blast Furnace Gas Flow (m^3/hr)	Natural Gas Flow (m^3/hr)	Total Gas Flow (m^3/hr)	Blast Furnace Gas Proportion (%)	Natural Gas Proportion (%)
02/01/2023 00:00	2,135.99	4,273.68	6,409.67	33.324%	66.676%
03/01/2023 00:00	2,038.19	4,079.88	6,118.07	33.314%	66.686%
04/01/2023 00:00	1,085.63	2,208.85	3,294.47	32.953%	67.047%
05/01/2023 00:00	1,070.48	2,145.17	3,215.65	33.290%	66.710%
06/01/2023 00:00	1,579.31	3,194.86	4,774.16	33.080%	66.920%
07/01/2023 00:00	1,729.93	3,504.83	5,234.76	33.047%	66.953%
08/01/2023 00:00	1,585.28	3,172.70	4,757.97	33.318%	66.682%
09/01/2023 00:00	602.727	1,294.03	1,896.75	31.777%	68.223%
10/01/2023 00:00	504.86	1,064.84	1,569.70	32.163%	67.837%
11/01/2023 00:00	1,252.72	2,510.19	3,762.90	33.291%	66.709%
12/01/2023 00:00	2,271.10	4,556.15	6,827.25	33.265%	66.735%
13/01/2023 00:00	2,714.25	5,448.45	8,162.71	33.252%	66.748%
14/01/2023 00:00	1,901.51	3,817.47	5,718.99	33.249%	66.751%
15/01/2023 00:00	1,289.20	2,633.77	3,922.97	32.863%	67.137%
16/01/2023 00:00	2,048.82	4,134.45	6,183.27	33.135%	66.865%
17/01/2023 00:00	1,674.59	3,383.95	5,058.53	33.104%	66.896%
18/01/2023 00:00	941.568	2,033.80	2,975.37	31.645%	68.355%
19/01/2023 00:00	2,766.79	5,534.91	8,301.69	33.328%	66.672%
20/01/2023 00:00	2,509.06	5,020.96	7,530.02	33.321%	66.679%
21/01/2023 00:00	2,321.53	4,644.78	6,966.31	33.325%	66.675%
22/01/2023 00:00	2,197.94	4,393.42	6,591.36	33.346%	66.654%
23/01/2023 00:00	2,539.17	5,081.57	7,620.73	33.319%	66.681%
24/01/2023 00:00	2,722.41	5,445.41	8,167.82	33.331%	66.669%
25/01/2023 00:00	1,307.18	2,624.36	3,931.54	33.249%	66.751%
26/01/2023 00:00	909.39	1,827.09	2,736.48	33.232%	66.768%
27/01/2023 00:00	395.094	794.22	1,189.31	33.220%	66.780%
28/01/2023 00:00	2,447.54	4,914.13	7,361.67	33.247%	66.753%
29/01/2023 00:00	726.813	1,478.14	2,204.95	32.963%	67.037%
30/01/2023 00:00	1,542.86	3,103.10	4,645.95	33.209%	66.791%
31/01/2023 00:00	1,499.02	3,065.37	4,564.39	32.842%	67.158%
01/02/2023 00:00	1,654.63	3,316.90	4,971.54	33.282%	66.718%
02/02/2023 00:00	1,293.05	2,625.44	3,918.49	32.999%	67.001%
03/02/2023 00:00	559.59	1,150.02	1,709.61	32.732%	67.268%
04/02/2023 00:00	773.033	1,556.12	2,329.15	33.190%	66.810%
05/02/2023 00:00	1,170.65	2,369.48	3,540.13	33.068%	66.932%
06/02/2023 00:00	1,754.46	3,506.44	5,260.90	33.349%	66.651%
07/02/2023 00:00	1,708.79	3,424.58	5,133.38	33.288%	66.712%
08/02/2023 00:00	1,088.00	2,211.85	3,299.85	32.971%	67.029%

24hrs to time	Blast Furnace Gas Flow (m^3/hr)	Natural Gas Flow (m^3/hr)	Total Gas Flow (m^3/hr)	Blast Furnace Gas Proportion (%)	Natural Gas Proportion (%)
09/02/2023 00:00	1,337.24	2,687.21	4,024.46	33.228%	66.772%
10/02/2023 00:00	1,394.63	2,815.92	4,210.55	33.122%	66.878%
11/02/2023 00:00	713.087	1,484.86	2,197.95	32.443%	67.557%
12/02/2023 00:00	1,494.55	3,026.13	4,520.68	33.060%	66.940%
13/02/2023 00:00	1,102.76	2,239.09	3,341.85	32.998%	67.002%
14/02/2023 00:00	1,404.43	2,888.95	4,293.38	32.712%	67.288%
15/02/2023 00:00	1,067.04	2,250.47	3,317.51	32.164%	67.836%
16/02/2023 00:00	1,456.20	2,921.77	4,377.96	33.262%	66.738%
17/02/2023 00:00	716.155	1,477.17	2,193.32	32.652%	67.348%
18/02/2023 00:00	1,377.11	2,800.08	4,177.19	32.967%	67.033%
19/02/2023 00:00	839.05	1,682.44	2,521.49	33.276%	66.724%
20/02/2023 00:00	574.857	1,187.67	1,762.52	32.616%	67.384%
21/02/2023 00:00	611.621	1,281.67	1,893.29	32.305%	67.695%
22/02/2023 00:00	576.024	1,162.84	1,738.86	33.127%	66.873%
23/02/2023 00:00	1,034.04	2,079.29	3,113.33	33.213%	66.787%
24/02/2023 00:00	1,131.21	2,322.63	3,453.85	32.752%	67.248%
25/02/2023 00:00	1,663.90	3,350.27	5,014.17	33.184%	66.816%
26/02/2023 00:00	2,147.54	4,314.11	6,461.65	33.235%	66.765%
27/02/2023 00:00	1,708.63	3,426.12	5,134.75	33.276%	66.724%
28/02/2023 00:00	1,683.32	3,390.34	5,073.65	33.178%	66.822%
01/03/2023 00:00	1,002.38	2,013.76	3,016.13	33.234%	66.766%
02/03/2023 00:00	1,045.91	2,093.38	3,139.29	33.317%	66.683%
03/03/2023 00:00	1,052.45	2,161.07	3,213.53	32.751%	67.249%
04/03/2023 00:00	1,007.18	2,015.24	3,022.42	33.324%	66.676%
05/03/2023 00:00	1,354.68	2,716.54	4,071.23	33.275%	66.725%
06/03/2023 00:00	1,249.39	2,593.97	3,843.35	32.508%	67.492%
07/03/2023 00:00	561.306	1,156.46	1,717.77	32.676%	67.324%
08/03/2023 00:00	345.807	757.546	1,103.35	31.341%	68.659%
09/03/2023 00:00	200.447	415.257	615.70	32.556%	67.444%
10/03/2023 00:00	129.975	278.218	408.19	31.842%	68.158%
11/03/2023 00:00	942.096	1,888.44	2,830.54	33.283%	66.717%
12/03/2023 00:00	545.3	1,091.54	1,636.84	33.314%	66.686%
13/03/2023 00:00	1,711.50	3,458.60	5,170.09	33.104%	66.896%
14/03/2023 00:00	845.586	1,695.37	2,540.96	33.278%	66.722%
15/03/2023 00:00	545.77	1,103.66	1,649.43	33.088%	66.912%
16/03/2023 00:00	1,574.51	3,156.21	4,730.71	33.283%	66.717%
17/03/2023 00:00	1,375.91	2,774.31	4,150.22	33.153%	66.847%
18/03/2023 00:00	444.983	896.51	1,341.49	33.171%	66.829%

24hrs to time	Blast Furnace Gas Flow (m^3/hr)	Natural Gas Flow (m^3/hr)	Total Gas Flow (m^3/hr)	Blast Furnace Gas Proportion (%)	Natural Gas Proportion (%)
19/03/2023 00:00	1,263.88	2,535.15	3,799.02	33.268%	66.732%
20/03/2023 00:00	917.05	1,860.53	2,777.58	33.016%	66.984%
21/03/2023 00:00	1,498.40	3,037.40	4,535.81	33.035%	66.965%
22/03/2023 00:00	1,953.39	3,907.93	5,861.31	33.327%	66.673%
23/03/2023 00:00	1,839.53	3,691.92	5,531.46	33.256%	66.744%
24/03/2023 00:00	1,508	3,083.69	4,591.69	32.842%	67.158%
25/03/2023 00:00	1,197.22	2,410.28	3,607.50	33.187%	66.813%
26/03/2023 00:00	415.124	872.036	1,287.16	32.251%	67.749%
27/03/2023 01:00	1,802.73	3,616.01	5,418.75	33.268%	66.732%
28/03/2023 01:00	798.731	1,673.54	2,472.27	32.308%	67.692%
29/03/2023 01:00	1,418.38	2,869.84	4,288.22	33.076%	66.924%
30/03/2023 01:00	552.321	1,147.54	1,699.86	32.492%	67.508%
31/03/2023 01:00	160.886	322.971	483.86	33.251%	66.749%
01/04/2023 01:00	597.951	1,197.85	1,795.80	33.297%	66.703%
02/04/2023 01:00	697.708	1,403.64	2,101.35	33.203%	66.797%
03/04/2023 01:00	433.396	867.137	1,300.53	33.324%	66.676%
04/04/2023 01:00	1,027.34	2,083.77	3,111.11	33.022%	66.978%
05/04/2023 01:00	781.939	1,586.21	2,368.15	33.019%	66.981%
06/04/2023 01:00	429.026	875.271	1,304.30	32.893%	67.107%
07/04/2023 01:00	1,061.38	2,126.07	3,187.45	33.299%	66.701%
08/04/2023 01:00	97.302	199.01	296.31	32.838%	67.162%
09/04/2023 01:00	966.111	1,937.70	2,903.81	33.270%	66.730%
10/04/2023 01:00	1,871.04	3,740.22	5,611.26	33.344%	66.656%
11/04/2023 01:00	1,195.66	2,506.60	3,702.26	32.296%	67.704%
12/04/2023 01:00	858.969	1,792.68	2,651.65	32.394%	67.606%
13/04/2023 01:00	630.225	1,334	1,964.23	32.085%	67.915%
14/04/2023 01:00	1,599.67	3,226.97	4,826.65	33.143%	66.857%
15/04/2023 01:00	1,523.02	3,050.08	4,573.10	33.304%	66.696%
16/04/2023 01:00	971.959	1,978.28	2,950.24	32.945%	67.055%
17/04/2023 01:00	2,387.25	4,788.01	7,175.26	33.271%	66.729%
18/04/2023 01:00	865.858	1,738.74	2,604.60	33.243%	66.757%
19/04/2023 01:00	291.888	589.534	881.42	33.116%	66.884%
21/04/2023 01:00	373.526	771.855	1,145.38	32.612%	67.388%
22/04/2023 01:00	251.478	519.682	771.16	32.610%	67.390%
23/04/2023 01:00	644.288	1,305.45	1,949.74	33.045%	66.955%
24/04/2023 01:00	2,568.47	5,161.14	7,729.61	33.229%	66.771%
25/04/2023 01:00	2,107.84	4,216.52	6,324.35	33.329%	66.671%
26/04/2023 01:00	1,260.18	2,524.69	3,784.87	33.295%	66.705%

24hrs to time	Blast Furnace Gas Flow (m^3/hr)	Natural Gas Flow (m^3/hr)	Total Gas Flow (m^3/hr)	Blast Furnace Gas Proportion (%)	Natural Gas Proportion (%)
27/04/2023 01:00	957.417	1,918.01	2,875.42	33.297%	66.703%
28/04/2023 01:00	1,489.79	3,099.38	4,589.18	32.463%	67.537%
29/04/2023 01:00	1,265.99	2,537.56	3,803.55	33.284%	66.716%
30/04/2023 01:00	2,259.46	4,522.19	6,781.65	33.317%	66.683%
01/05/2023 01:00	1,420.86	2,854.77	4,275.62	33.232%	66.768%
02/05/2023 01:00	2,137.58	4,280.28	6,417.86	33.307%	66.693%
03/05/2023 01:00	916.933	1,846.17	2,763.10	33.185%	66.815%
04/05/2023 01:00	1,375.14	2,761.62	4,136.76	33.242%	66.758%
05/05/2023 01:00	1,101.95	2,244.55	3,346.50	32.928%	67.072%
06/05/2023 01:00	1,284.57	2,571.60	3,856.17	33.312%	66.688%
07/05/2023 01:00	746.94	1,521.03	2,267.97	32.934%	67.066%
08/05/2023 01:00	1,581.54	3,220	4,801.54	32.938%	67.062%
09/05/2023 01:00	1,264.85	2,611.58	3,876.43	32.629%	67.371%
10/05/2023 01:00	956.654	1,930.40	2,887.06	33.136%	66.864%
11/05/2023 01:00	1,487.45	2,982.47	4,469.92	33.277%	66.723%
12/05/2023 01:00	2,788.04	5,580.45	8,368.49	33.316%	66.684%
13/05/2023 01:00	1,724.54	3,452.50	5,177.04	33.311%	66.689%
14/05/2023 01:00	2,260.90	4,532.55	6,793.45	33.281%	66.719%
15/05/2023 01:00	1,151.90	2,309.14	3,461.04	33.282%	66.718%
16/05/2023 01:00	1,345.35	2,700.62	4,045.97	33.252%	66.748%
17/05/2023 01:00	2,020.44	4,040.07	6,060.51	33.338%	66.662%
18/05/2023 01:00	1,681.06	3,363.99	5,045.05	33.321%	66.679%
19/05/2023 01:00	1,596.58	3,196.68	4,793.27	33.309%	66.691%
20/05/2023 01:00	1,567.28	3,140.41	4,707.70	33.292%	66.708%
21/05/2023 01:00	1,362.06	2,753.13	4,115.20	33.098%	66.902%
22/05/2023 01:00	1,701.30	3,399.02	5,100.33	33.357%	66.643%
23/05/2023 01:00	1,423.39	2,849.93	4,273.32	33.309%	66.691%
24/05/2023 01:00	1,563.36	3,156.88	4,720.24	33.120%	66.880%
25/05/2023 01:00	1,286.62	2,595.54	3,882.16	33.142%	66.858%
26/05/2023 01:00	1,403.25	2,820.31	4,223.56	33.224%	66.776%
27/05/2023 01:00	1,861.94	3,729.30	5,591.25	33.301%	66.699%
28/05/2023 01:00	1,464.40	2,984.14	4,448.54	32.919%	67.081%
29/05/2023 01:00	416.504	909.712	1,326.22	31.405%	68.595%
30/05/2023 01:00	1,937.80	3,876.99	5,814.79	33.325%	66.675%
31/05/2023 01:00	1,553.88	3,106.88	4,660.76	33.340%	66.660%
01/06/2023 01:00	124.737	261.283	386.02	32.314%	67.686%
02/06/2023 01:00	121.154	244.13	365.28	33.167%	66.833%
03/06/2023 01:00	226.158	455.909	682.07	33.158%	66.842%

24hrs to time	Blast Furnace Gas Flow (m^3/hr)	Natural Gas Flow (m^3/hr)	Total Gas Flow (m^3/hr)	Blast Furnace Gas Proportion (%)	Natural Gas Proportion (%)
04/06/2023 01:00	717.911	1,443.71	2,161.62	33.212%	66.788%
05/06/2023 01:00	628.6	1,258.31	1,886.91	33.314%	66.686%
06/06/2023 01:00	193.419	389.62	583.04	33.174%	66.826%
07/06/2023 01:00	172.043	343.567	515.61	33.367%	66.633%
08/06/2023 01:00	756.816	1,543.54	2,300.36	32.900%	67.100%
09/06/2023 01:00	1,780.65	3,572.62	5,353.26	33.263%	66.737%
10/06/2023 01:00	1,548.27	3,098.10	4,646.37	33.322%	66.678%
11/06/2023 01:00	2,992.00	5,984.44	8,976.44	33.332%	66.668%
12/06/2023 01:00	4,962.62	9,926.14	14,888.76	33.331%	66.669%
13/06/2023 01:00	1,472.05	2,993.78	4,465.83	32.962%	67.038%
14/06/2023 01:00	1,098.70	2,205.76	3,304.46	33.249%	66.751%
15/06/2023 01:00	1,370.92	2,745.07	4,115.99	33.307%	66.693%
16/06/2023 01:00	2,036.60	4,078.80	6,115.41	33.303%	66.697%
17/06/2023 01:00	3,808.73	7,617.68	11,426.41	33.333%	66.667%
18/06/2023 01:00	2,106.45	4,236.27	6,342.73	33.211%	66.789%
19/06/2023 01:00	4,310.71	8,619.45	12,930.16	33.338%	66.662%
20/06/2023 01:00	3,829.04	7,659.92	11,488.96	33.328%	66.672%
21/06/2023 01:00	1,541.47	3,121.78	4,663.24	33.056%	66.944%
22/06/2023 01:00	2,893.66	5,801.33	8,694.98	33.280%	66.720%
23/06/2023 01:00	2,422.64	4,847.33	7,269.97	33.324%	66.676%
24/06/2023 01:00	787.644	1,583.87	2,371.51	33.213%	66.787%
25/06/2023 01:00	1,950.18	3,903.05	5,853.23	33.318%	66.682%
26/06/2023 01:00	3,981.88	7,964.84	11,946.73	33.330%	66.670%
27/06/2023 01:00	3,501.03	7,007.94	10,508.97	33.315%	66.685%
28/06/2023 01:00	1,574.35	3,195.47	4,769.82	33.007%	66.993%
29/06/2023 01:00	1,737.86	3,521.03	5,258.89	33.046%	66.954%
30/06/2023 01:00	1,827.58	3,661.31	5,488.89	33.296%	66.704%
01/07/2023 01:00	1,147.95	2,301.15	3,449.10	33.283%	66.717%
02/07/2023 01:00	1,351.28	2,790.41	4,141.68	32.626%	67.374%
03/07/2023 01:00	1,382.95	2,784.09	4,167.03	33.188%	66.812%
04/07/2023 01:00	1,175.33	2,358.98	3,534.32	33.255%	66.745%
05/07/2023 01:00	822.246	1,645.48	2,467.73	33.320%	66.680%
06/07/2023 01:00	871.582	1,744.71	2,616.29	33.314%	66.686%
07/07/2023 01:00	2,755.81	5,527.46	8,283.27	33.270%	66.730%
08/07/2023 01:00	1,560.29	3,243.21	4,803.50	32.482%	67.518%
09/07/2023 01:00	2,324.01	4,656.56	6,980.57	33.293%	66.707%
10/07/2023 01:00	1,067.23	2,143.62	3,210.85	33.238%	66.762%
11/07/2023 01:00	1,652.78	3,363.32	5,016.10	32.949%	67.051%

24hrs to time	Blast Furnace Gas Flow (m^3/hr)	Natural Gas Flow (m^3/hr)	Total Gas Flow (m^3/hr)	Blast Furnace Gas Proportion (%)	Natural Gas Proportion (%)
12/07/2023 01:00	1,188.50	2,514.98	3,703.48	32.091%	67.909%
13/07/2023 01:00	1,755.76	3,548.10	5,303.86	33.103%	66.897%
14/07/2023 01:00	2,308.42	4,640.62	6,949.04	33.219%	66.781%
15/07/2023 01:00	1,314.68	2,691.06	4,005.74	32.820%	67.180%
16/07/2023 01:00	1,989.27	3,998.44	5,987.72	33.223%	66.777%
17/07/2023 01:00	2,219.81	4,456.58	6,676.39	33.249%	66.751%
18/07/2023 01:00	2,337.34	4,678.34	7,015.68	33.316%	66.684%
19/07/2023 01:00	3,272.75	6,547.52	9,820.27	33.326%	66.674%
20/07/2023 01:00	2,644.03	5,293.66	7,937.69	33.310%	66.690%
21/07/2023 01:00	1,736.77	3,478.82	5,215.59	33.300%	66.700%
22/07/2023 01:00	2,280.10	4,654.31	6,934.41	32.881%	67.119%
23/07/2023 01:00	585.399	1,172.31	1,757.71	33.305%	66.695%
24/07/2023 01:00	391.274	832.851	1,224.13	31.964%	68.036%
28/07/2023 01:00	669.751	1,462.32	2,132.07	31.413%	68.587%
29/07/2023 01:00	786.51	1,832.86	2,619.37	30.027%	69.973%
30/07/2023 01:00	1,654.63	3,311.44	4,966.08	33.319%	66.681%
31/07/2023 01:00	1,789.19	3,591.74	5,380.92	33.251%	66.749%
01/08/2023 01:00	1,330.77	2,709.53	4,040.30	32.937%	67.063%
02/08/2023 01:00	580.621	1,408.72	1,989.34	29.187%	70.813%
03/08/2023 01:00	1,314.52	2,642.73	3,957.25	33.218%	66.782%
04/08/2023 01:00	960.404	1,944.92	2,905.32	33.057%	66.943%
05/08/2023 01:00	395.059	795.925	1,190.98	33.171%	66.829%
06/08/2023 01:00	931.366	1,890.80	2,822.17	33.002%	66.998%
07/08/2023 01:00	2,059.25	4,119.44	6,178.69	33.328%	66.672%
08/08/2023 01:00	1,384.12	2,778.02	4,162.14	33.255%	66.745%
09/08/2023 01:00	1,236.04	2,485.02	3,721.05	33.217%	66.783%
10/08/2023 01:00	1,124.28	2,273.85	3,398.13	33.085%	66.915%
11/08/2023 01:00	1,371.30	2,742.89	4,114.19	33.331%	66.669%
12/08/2023 01:00	2,164.14	4,380.08	6,544.22	33.069%	66.931%
13/08/2023 01:00	2,525.56	5,057.01	7,582.56	33.307%	66.693%
14/08/2023 01:00	2,280.55	4,578.86	6,859.41	33.247%	66.753%
15/08/2023 01:00	2,176.38	4,363.96	6,540.34	33.276%	66.724%
16/08/2023 01:00	1,027.53	2,066.22	3,093.75	33.213%	66.787%
17/08/2023 01:00	2,778.57	5,560.90	8,339.47	33.318%	66.682%
18/08/2023 01:00	4,142.10	8,290.55	12,432.65	33.316%	66.684%
19/08/2023 01:00	2,226.18	4,465.66	6,691.83	33.267%	66.733%
20/08/2023 01:00	2,671.77	5,359.39	8,031.16	33.268%	66.732%
21/08/2023 01:00	1,905.07	3,818.78	5,723.84	33.283%	66.717%

24hrs to time	Blast Furnace Gas Flow (m^3/hr)	Natural Gas Flow (m^3/hr)	Total Gas Flow (m^3/hr)	Blast Furnace Gas Proportion (%)	Natural Gas Proportion (%)
22/08/2023 01:00	2,635.61	5,280.56	7,916.17	33.294%	66.706%
23/08/2023 01:00	1,406.24	2,847.24	4,253.48	33.061%	66.939%
24/08/2023 01:00	1,465.13	2,936.15	4,401.28	33.289%	66.711%
25/08/2023 01:00	2,166.95	4,378.51	6,545.45	33.106%	66.894%
26/08/2023 01:00	2,271.85	4,633.81	6,905.65	32.898%	67.102%
27/08/2023 01:00	2,235.82	4,511.73	6,747.55	33.135%	66.865%
28/08/2023 01:00	2,541.26	5,112.85	7,654.11	33.201%	66.799%
29/08/2023 01:00	3,275.51	6,554.59	9,830.09	33.321%	66.679%
30/08/2023 01:00	2,036.09	4,073.52	6,109.61	33.326%	66.674%
31/08/2023 01:00	1,562.46	3,128.33	4,690.79	33.309%	66.691%
01/09/2023 01:00	3,501.26	7,017.52	10,518.78	33.286%	66.714%
02/09/2023 01:00	2,262.92	4,551.86	6,814.78	33.206%	66.794%
03/09/2023 01:00	2,206.51	4,425.16	6,631.67	33.272%	66.728%
04/09/2023 01:00	2,912.22	5,842.66	8,754.88	33.264%	66.736%
05/09/2023 01:00	2,741.09	5,500.22	8,241.31	33.260%	66.740%
06/09/2023 01:00	2,215.38	4,442.82	6,658.20	33.273%	66.727%
07/09/2023 01:00	1,070.44	2,144.84	3,215.29	33.292%	66.708%
08/09/2023 01:00	1,545.96	3,101.25	4,647.21	33.266%	66.734%
09/09/2023 01:00	3,840.70	7,683.72	11,524.42	33.327%	66.673%
10/09/2023 01:00	1,233.22	2,466.23	3,699.45	33.335%	66.665%
11/09/2023 01:00	1,084.55	2,172.82	3,257.37	33.295%	66.705%
12/09/2023 01:00	1,156.64	2,315.00	3,471.64	33.317%	66.683%
13/09/2023 01:00	1,778.95	3,567.95	5,346.90	33.271%	66.729%
14/09/2023 01:00	3,113.88	6,239.81	9,353.69	33.290%	66.710%
15/09/2023 01:00	2,919.59	5,849.02	8,768.61	33.296%	66.704%
16/09/2023 01:00	2,021.29	4,047.88	6,069.17	33.304%	66.696%
17/09/2023 01:00	2,003.93	4,011.44	6,015.36	33.314%	66.686%
18/09/2023 01:00	1,552.90	3,128.40	4,681.30	33.172%	66.828%
19/09/2023 01:00	2,909.25	5,832.69	8,741.94	33.279%	66.721%
20/09/2023 01:00	2,196.81	4,409.08	6,605.88	33.255%	66.745%
21/09/2023 01:00	3,366.50	6,732.44	10,098.94	33.335%	66.665%
22/09/2023 01:00	4,136.71	8,276.51	12,413.22	33.325%	66.675%
23/09/2023 01:00	3,134.29	6,276.22	9,410.51	33.306%	66.694%
24/09/2023 01:00	3,776.93	7,559.12	11,336.05	33.318%	66.682%
25/09/2023 01:00	3,888.76	7,791.02	11,679.78	33.295%	66.705%
26/09/2023 01:00	2,979.76	5,960.50	8,940.26	33.330%	66.670%
27/09/2023 01:00	1,533.73	3,086.18	4,619.91	33.198%	66.802%
28/09/2023 01:00	2,179.00	4,356.54	6,535.54	33.341%	66.659%

24hrs to time	Blast Furnace Gas Flow (m^3/hr)	Natural Gas Flow (m^3/hr)	Total Gas Flow (m^3/hr)	Blast Furnace Gas Proportion (%)	Natural Gas Proportion (%)
29/09/2023 01:00	2,712.71	5,431.41	8,144.12	33.309%	66.691%
30/09/2023 01:00	4,142.26	8,285.61	12,427.87	33.330%	66.670%
01/10/2023 01:00	3,578.99	7,169.40	10,748.39	33.298%	66.702%
02/10/2023 01:00	1,376.09	2,761.13	4,137.22	33.261%	66.739%
03/10/2023 01:00	2,823.92	5,654.66	8,478.58	33.307%	66.693%
04/10/2023 01:00	2,254.45	4,512.97	6,767.42	33.313%	66.687%
05/10/2023 01:00	2,930.76	5,923.48	8,854.24	33.100%	66.900%
06/10/2023 01:00	2,951.70	5,910.53	8,862.22	33.307%	66.693%
07/10/2023 01:00	3,393.49	6,789.08	10,182.58	33.326%	66.674%
08/10/2023 01:00	2,165.36	4,350.35	6,515.71	33.233%	66.767%
09/10/2023 01:00	296.787	603.961	900.75	32.949%	67.051%
11/10/2023 01:00	487.434	965.475	1,452.91	33.549%	66.451%
12/10/2023 01:00	795.698	1,594.65	2,390.35	33.288%	66.712%
13/10/2023 01:00	805.767	1,623.86	2,429.63	33.164%	66.836%
14/10/2023 01:00	1,018.84	2,047.79	3,066.64	33.223%	66.777%
15/10/2023 01:00	626.989	1,274.61	1,901.60	32.972%	67.028%
16/10/2023 01:00	517.559	1,037.83	1,555.39	33.275%	66.725%
17/10/2023 01:00	184.281	367.159	551.44	33.418%	66.582%
18/10/2023 01:00	92.376	189.416	281.79	32.782%	67.218%
19/10/2023 01:00	1,030.19	2,060.92	3,091.11	33.327%	66.673%
20/10/2023 01:00	1,487.80	2,969.19	4,456.99	33.381%	66.619%
21/10/2023 01:00	650.11	1,299.61	1,949.72	33.344%	66.656%
22/10/2023 01:00	1,179.01	2,361.38	3,540.39	33.302%	66.698%
23/10/2023 01:00	339.343	679.513	1,018.86	33.306%	66.694%
24/10/2023 01:00	839.728	1,682.53	2,522.26	33.293%	66.707%
25/10/2023 01:00	1,251.18	2,508.41	3,759.59	33.280%	66.720%
26/10/2023 01:00	2,379.91	4,778.88	7,158.79	33.245%	66.755%
27/10/2023 01:00	3,095.45	6,197.29	9,292.74	33.310%	66.690%
28/10/2023 01:00	2,462.66	4,943.49	7,406.15	33.252%	66.748%
29/10/2023 01:00	2,441.75	4,888.79	7,330.55	33.309%	66.691%
30/10/2023 00:00	2,911.67	5,829.19	8,740.86	33.311%	66.689%
31/10/2023 00:00	642.723	1,285.66	1,928.38	33.330%	66.670%
02/11/2023 00:00	1,912.36	3,841.85	5,754.21	33.234%	66.766%
03/11/2023 00:00	3,001.25	6,006.59	9,007.84	33.318%	66.682%
04/11/2023 00:00	3,308.26	6,612.18	9,920.44	33.348%	66.652%
05/11/2023 00:00	3,437.61	6,875.20	10,312.81	33.333%	66.667%
06/11/2023 00:00	1,492.17	3,006.94	4,499.11	33.166%	66.834%
07/11/2023 00:00	988.108	1,978.32	2,966.42	33.310%	66.690%

24hrs to time	Blast Furnace Gas Flow (m^3/hr)	Natural Gas Flow (m^3/hr)	Total Gas Flow (m^3/hr)	Blast Furnace Gas Proportion (%)	Natural Gas Proportion (%)
08/11/2023 00:00	1,981.55	3,965.60	5,947.15	33.319%	66.681%
09/11/2023 00:00	2,901.12	5,791.38	8,692.49	33.375%	66.625%
10/11/2023 00:00	1,240.03	2,537.04	3,777.06	32.830%	67.170%
11/11/2023 00:00	2,073.05	4,185.62	6,258.67	33.123%	66.877%
12/11/2023 00:00	3,369.03	6,752.23	10,121.26	33.287%	66.713%
13/11/2023 00:00	2,214.59	4,436.89	6,651.48	33.295%	66.705%
14/11/2023 00:00	2,332.27	4,660.35	6,992.62	33.353%	66.647%
15/11/2023 00:00	1,504.91	3,023.27	4,528.19	33.234%	66.766%
16/11/2023 00:00	1,543.88	3,091.81	4,635.69	33.304%	66.696%
17/11/2023 00:00	1,444.83	2,892.87	4,337.71	33.309%	66.691%
18/11/2023 00:00	1,277.54	2,560.71	3,838.26	33.284%	66.716%
19/11/2023 00:00	426.696	857.639	1,284.34	33.223%	66.777%
20/11/2023 00:00	1,893.02	3,786.81	5,679.82	33.329%	66.671%
21/11/2023 00:00	1,676.93	3,349.17	5,026.10	33.364%	66.636%
22/11/2023 00:00	1,564.21	3,138.07	4,702.28	33.265%	66.735%
23/11/2023 00:00	2,116.20	4,237.39	6,353.58	33.307%	66.693%
24/11/2023 00:00	1,939.93	3,879.93	5,819.86	33.333%	66.667%
25/11/2023 00:00	1,901.45	3,809.10	5,710.56	33.297%	66.703%
26/11/2023 00:00	1,403.99	2,810.37	4,214.36	33.314%	66.686%
27/11/2023 00:00	1,334.72	2,681.76	4,016.48	33.231%	66.769%
28/11/2023 00:00	2,636.20	5,283.52	7,919.71	33.287%	66.713%
29/11/2023 00:00	3,285.70	6,571.81	9,857.50	33.332%	66.668%
30/11/2023 00:00	3,001.60	5,997.86	8,999.46	33.353%	66.647%
01/12/2023 00:00	1,590.73	3,197.76	4,788.49	33.220%	66.780%
02/12/2023 00:00	1,427.85	2,860.48	4,288.32	33.296%	66.704%
03/12/2023 00:00	452.894	909.145	1,362.04	33.251%	66.749%
04/12/2023 00:00	1,035.58	2,076.53	3,112.11	33.276%	66.724%
05/12/2023 00:00	2,191.08	4,387.55	6,578.63	33.306%	66.694%
06/12/2023 00:00	1,454.50	2,914.23	4,368.73	33.293%	66.707%
07/12/2023 00:00	728.288	1,459.02	2,187.31	33.296%	66.704%
08/12/2023 00:00	968.508	1,935.81	2,904.32	33.347%	66.653%
09/12/2023 00:00	1,395.26	2,799.31	4,194.58	33.264%	66.736%
10/12/2023 00:00	1,408.80	2,827.84	4,236.64	33.253%	66.747%
11/12/2023 00:00	1,917.92	3,841.74	5,759.66	33.299%	66.701%
12/12/2023 00:00	2,162.50	4,333.95	6,496.45	33.287%	66.713%
13/12/2023 00:00	2,573.13	5,156.10	7,729.23	33.291%	66.709%
14/12/2023 00:00	2,223.42	4,451.36	6,674.78	33.311%	66.689%
15/12/2023 00:00	2,500.76	5,009.69	7,510.45	33.297%	66.703%

24hrs to time	Blast Furnace Gas Flow (m^3/hr)	Natural Gas Flow (m^3/hr)	Total Gas Flow (m^3/hr)	Blast Furnace Gas Proportion (%)	Natural Gas Proportion (%)
16/12/2023 00:00	2,630.36	5,255.02	7,885.38	33.357%	66.643%
17/12/2023 00:00	2,051.26	4,108.23	6,159.50	33.302%	66.698%
18/12/2023 00:00	2,074.07	4,159.19	6,233.27	33.274%	66.726%
19/12/2023 00:00	2,837.31	5,684.00	8,521.31	33.297%	66.703%
20/12/2023 00:00	777.677	1,556.89	2,334.56	33.311%	66.689%
21/12/2023 00:00	471.296	943.39	1,414.69	33.315%	66.685%
22/12/2023 00:00	3,294.00	6,590.03	9,884.04	33.326%	66.674%
23/12/2023 00:00	2,940.52	5,889.17	8,829.69	33.303%	66.697%
24/12/2023 00:00	1,547.62	3,095.85	4,643.46	33.329%	66.671%
25/12/2023 00:00	317.708	636.82	954.53	33.284%	66.716%
26/12/2023 00:00	542.497	1,086.25	1,628.75	33.308%	66.692%
27/12/2023 00:00	181.248	364.247	545.50	33.226%	66.774%
28/12/2023 00:00	582.577	1,162.07	1,744.64	33.392%	66.608%
29/12/2023 00:00	460.665	928.393	1,389.06	33.164%	66.836%
30/12/2023 00:00	345.052	695.067	1,040.12	33.174%	66.826%
Average				33.122%	66.878%

Appendix 3 – Plant operating techniques

2.3.22 STEAM AND POWER GENERATION PLANTS

CONTENTS

SPG 1 INTRODUCTION

This part of the application covers the operation of the steam and power generation plants which encompasses the following specific plant operations:

(i) Central Power Station
(ii) Turbo Blower House

The Central Power Station utilises works arising gases and purchased fuels to produce steam for process use, space heating and electrical generation. The plant was built in 1976 and currently operates 2 boilers and 4 turbo-alternators. There is a continuous demand for steam and internal electrical generation. All plant items are thus operated year round, with some redundancy for planned stoppages. The plant has a steam raising capacity of 250t/hr, with a generation capacity of 43 MW.

The Turbo Blower House also utilises works arising gases and purchased fuels to produce steam, mainly for producing blowing wind to the blast furnaces, but with some export process steam and electrical generation capacity. The plant was primarily built in 1953 but has been expanded over the years and now has 6 boilers, 5 turbo-blowers, and 1 turbo-alternators. The process operates continuously, with some plant redundancy for planned outages. The plant has a steam raising capacity of 276t/hr and a generation capacity of 22 MW.

Both boiler plants consume gaseous fuels which are produced from the iron making process, which would otherwise have to be bled to the atmosphere and ignited. The plants are thus an important component in managing the site energy balance.

These gases include Blast Furnace Gas (BFG) and BOS gas from the steelmaking plant.

BFG is blended with natural gas to form a fuel gas referred to as Synthetic Coke Oven Gas (SCOG). BOS gas and BF gas can also be blended to form Mixed Enhanced Gas (MEG). MEG is used on occasion in the Central Power Station, but not the Turbo Blower House.

Figure B 1 indicates the location of the plants, Figure B 2 shows the stock locations, Figure B 3 details stack locations and Figure B 4 gives drainage details for the area in question.

SPG 2 PROCESS DESCRIPTION

A flow diagram (Figure B 5) illustrates an overview of the process.

Central Power Station

The Central Power Station utilises works arising gases and purchased fuels (Nat. Gas and Fuel Oil) to produce steam for process uses and electrical generation. A schematic diagram of the process is provided in Figure B 6 and boiler and burner details are in Appendix 1.

Boilers

Boilers at the Central Power Station (CPS) are bi-drum water tube boilers of membrane wall construction and were built by International Combustion to their VU60 design.

Nos. 1 & 2 boilers are tri-fuel fired and each have a capacity of 124.72 tph Maximum Continuous Rating (MCR), with output steam nominally at 62 bar and 485ºC. The fuel gas is fired corner/tangentially low down in the boiler furnace through two burners mounted at each corner. Each pair of corner gas burners is mounted one on top of the other, with a natural gas pilot mounted between, displaced to one side. The SCOG, BFG and MEG are capable of being fired within each of these main burners. The Heavy Fuel Oil (HFO) is fired from five burners, mounted high up in the boiler furnace front wall, opposite the boiler exit superheater screen. The burners are mounted symmetrically about the vertical centre line and equidistantly spaced in two horizontal rows, two above and three below.

Turbo Alternators

The plant has seven turbo-alternators:-

Turbine 1 - Type - GEC - Passout/Condensing - 15MW
Turbine 2 - Type - GEC - Passout/Condensing - 15MW
Turbine 3 - Type - Richardson-Westgarth - Back Pressure - 5MW
Turbine 4 - Type - Richardson-Westgarth - Full Condensing - 8MW

The CPS steam routes are shown in figure B 6.

Turbo alternators 1 to 4 are used to convert the steam produced in the boilers into electrical energy. In some sets the steam is ‘passed out’ for export and is then utilised as process steam throughout the works. In the remaining sets steam is condensed and returned as feed water to the boilers.

The turbine generators produce electricity for Works consumption. Generation is always maintained above the "essential supplies" threshold of approximately 12-15 MW. This covers essential equipment at key plants, mainly the coke ovens and blast furnaces and also central services such as the two power plants, SCOG boosters and compressors.

Turbo Blower House

The Turbo Blower House (TBH) produces steam, primarily to drive the large turbo-blowers that provide the cold blast air to the blast furnaces. Through developments the plant also has some capacity to produce steam for process use and some electrical generation. A schematic of the plant is shown in figure B 7 and boiler and burner details are in Appendix 1.

Boilers

The Turbo Blower House (TBH) boilers are of water tube construction and are contained in a steel cased brick setting. Nos. 1 to 4 boilers are rated at 38.55 tph MCR and Nos. 5 & 6 boilers are rated at 61.22 tph MCR all feeding onto a common header at 31bar, 405^{o}C. They are all manufactured by John Thompson and are of the same generic Etaflo design. The boilers are fitted with Ljungstrom air heaters giving a nominal 200^{o}C air preheat. The boilers are bi-fuel fired on blast furnace gas (BFG) or heavy fuel oil (HFO). The oil burners are conventional steam atomised Y-jet burners.

The oil is fired from the front wall by two rows of oil burners, one row being on top of the other. In the case of Nos. 1 - 4 boilers there are 2 burners per row and in the case of Nos. 5 & 6 boilers there are 3 burners per row. The oil burners on Nos. 1 - 6 boilers are of Hamworthy manufacture. The BFG is opposed fired from the side walls of the boiler. Nos. 1 - 4 boilers have two burners on each side, all mounted in the same horizontal plane. On Nos. 5 & 6 boilers a third burner is mounted on each side, equidistantly spaced above the other two burners. The BFG burners each have SCOG pilot burners to maintain ignition of the BFG. The pilot burners are rated at 5% of MCR. Since the normal fuel fired on these boilers is BFG, for boiler and plant security reasons the pilot burners are normally lit at all times when the boilers are in use.

Blowers

The blowers supply the cold blast air required for the furnaces and are air compressors driven by steam turbines.

Blower A - Man GHH axial blower rated 120,000 to 200,000 Nm3/hr and up to 3 bar.

Blowers B to D - Parsons centrifugal blowers rated 80,000 to 140,000 Nm3/hr, up to 2.2 bar.

Blower E - Parsons centrifugal blower rated 180,000 to 280,000 Nm3/hr, up to 2.4 bar.

Altering the speed of the turbo-blower varies the volume and pressure delivered.

Turbo Alternators

Spare steam capacity not required for blowing wind to the blast furnaces is utilised for electrical generation using works arising gases or purchased fuels.

"H" Turbo-alternator is a Parsons fully condensing turbine of 20-23MW capacity.

SPG 3 PROCESS INPUTS AND OUTPUTS

SPG 3.1 Process Inputs

Gas Supplies

The main and pilot fuel gases (BFG and SCOG) are fed to the CPS and TBH via dedicated overhead pipelines as part of the general works distribution system. Typical gas constituents and properties are shown in Appendix 2.

Natural gas is used at the CPS for igniting the pilots. A high tension spark ignites the natural gas and air mixture which in turn lights the natural gas pilot burner.

Nitrogen (inert gas) is used to purge on and off the gas mains when repair work is required.

Fuel Oil Systems

Fuel oil is used at the CPS and TBH as a main fuel for firing in the boilers, but is primarily used when there is insufficient fuel gases available to maintain boiler loads or when plant problems/emergencies arise.

Heavy fuel oil is stored in one bunded 2000 tonne tank at the CPS and two bunded tanks (1 off 250 tonne and 1 off 650 tonne) at TBH. These tanks are filled from road tankers.

From the CPS storage tanks low pressure pumps transfer the oil to the CPS and then via high pressure pumps and steam heaters to the burners. The pumps have an integral relief valve to prevent overpressure to the system, and there is a further pressure control valve in the system to return oil to the storage tank.

From the TBH tanks, high pressure pumps transfer the oil direct to the boilers via steam heaters.

Feed Water

Demineralised water is pumped from storage tanks at the demineralisation plant to the CPS and pump/gravity fed to the TBH. Prior to being pumped to the boilers the water flows through a series of feed heaters, including air ejector condensers, drain coolers, gland heaters and low pressure steam feed heaters, to a deaerator.

Cooling Water

CPS - Cooling water is used in the turbine condenser and is re-circulated through 2 cooling towers external to the station. One cooling system serves turbines 1 and 2 with a large hyperbolic cooling tower, another for turbine 4 with smaller forced draught tower. Smaller

systems for oil cooling or gland steam condenser etc. are fed from one or other of the main cooling circuits. Make-up water to cover evaporative losses, bleed and leakage is supplied from the site water distribution system, primarily from the River Trent.

TBH - Cooling water is required for the blower and turbo-alternator condenser and some ancillary uses such as oil cooling. The cooling water is circulated through a single large hyperbolic cooling tower. Make-up water to cover evaporative losses, bleed and leakage is supplied from the site water distribution system, from the River Trent.

Compressed Air

Compressed air is a vital supply to the CPS and TBH. It is used to operate control valves, actuators, isolation valves and other equipment. Any disruption leading to eventual loss of this supply would trip the boilers and therefore effect operations.

The air must be moisture and oil free and clear of any foreign matter due to the fine orifices involved in the control and instrumentation equipment.

Compressed air is supplied via overhead pipework from a large central compressor station. The CPS has two local back-up motor-driven compressors that cut-in automatically on low pressure and the TBH has a single diesel-driven automatic back-up compressor.

Electricity

CPS - Ancillary drives for the boilers (e.g. ID/FD fans, feed pumps) and turbines (e.g. cooling water pumps, lube pumps) are fed from an internal electrical distribution system at 3.3 kV and 415v, transformed down from the 11kV system.

TBH - Ancillary drives for the boilers (e.g. ID/FD fans, feed pumps) and turbines (e.g. cooling water pumps, lub. pumps) are fed from an internal electrical distribution system at 415v from the adjacent blast furnace area.

Steam

Steam at various temperatures and pressures is returned internally locally within the CPS and TBH to provide various services, including feed-heaters, de-aerator, and air ejectors.

SPG 3.2 Process Outputs

Steam

The boilers at both the CPS and TBH produce large volumes of high pressure steam at various pressures and temperatures. This is primarily used internally to the stations for producing blowing wind and generating electricity but significant amounts of steam at nominal 13.8 bar pressure are exported for use by other plant processes. The routes and level

of interconnection between the two stations are shown in Figure B 8.

Steam is used in the blast furnaces for blast humidification, at the steelmaking plant for the vacuum degasser, small amount of steam used at ACO by-products on the ammonia stills and for most plant areas and offices for space heating.

Blast Furnace Blowing

At the TBH there are five large air blowers driven by steam turbines which produce up to approximately 600,000 Nm^3/hour of air at 1.4 to 2.2 bar, which is supplied via four cold blast mains, one for each furnace. This air is heated in the furnace stoves and then fed into the furnace via the tuyeres.

'A' blower is operated to one of the blast furnaces on its own, with two of the smaller 'B'-'D' blowers operated to two of the other furnaces. The large 'E' Blower also operates to a furnace on its own and, in addition, is operated using a 'split-wind' blowing practice, where air from 'E' blower is used to 'top-up' the wind volume to the two furnaces supplied by the smaller radial blowers. This is shown on the cold blast main arrangement in figure B 9.

Electricity

The CPS can generate up to circa 43 MW in the four main turbo-alternators, The TBH has a nominal capacity of around 22 MW in one turbo-alternators. The actual output varies with the levels of surplus works arising gases for generation instead of purchasing electricity. Site demand is typically 100 MW, the shortfall from generation being made up with import from the grid.

A level of around 8 MW generation output is maintained at the CPS to supply 'essential' electrical feeds in the event of a disconnection from the grid.

The generator connection points are all at 11kV, the majority at the CPS, but the TBH alternators are connected within the blast furnace and rod mill areas.

The grid connection point consists of three 132/33 kV transformers feeding into a 33kV distribution network around the site. Intermediate transformers from 33kV to 11kV at the CPS connect the generation to the works distribution.

SPG 3.3 Releases to Air, Water and Land

Releases to Air

The combustion of fossil-fuel based gases and oil gives rise to emissions, either through not being fully burnt or as the products of combustion. At both stations the emissions are typically carbon dioxide, carbon monoxide, sulphur dioxide, oxides of nitrogen and particulates or smoke. The emissions have been tested for other species (e.g. dioxins, VOCs

etc.) but these are not significant.

At the CPS the two boiler outlets are ducted to the base of a single stack (release point A201), of 96m height. At the TBH Boilers 1 to 4 are ducted to one stack (release point A202) and boilers 5 and 6 to another stack (release point A203), both of which are 76.2m in height.

Point Source Emissions

Details of release points to air, showing mass flows and concentrations of released substances, is given in Table B 3.3.1.

RELEASE POINT	SOURCE	SPECIES	TYPICAL CONCENTRATION		TYPICAL ANNUAL MASS EMISSION		RELEASE RATE	
A201 LCP341	CPS 1 & 2 BOILERS	Particulates	112	mg/m³	35,500	kg	1.19	g/s
		SO2	-	mg/m³	3,358.7	t	112.7	g/s
		NOx	583	mg/m³	406.8	t	13.65	g/s
		PM10	112	mg/m³	35,500	kg	1.19	g/s
		CO2	-	mg/m³	1,230	kt	41.2	kg/s
A202 LCP342	TBH 1 - 4 BOILERS	Particulates	135	mg/m³	17,388	kg	606	mg/s
		SO2		mg/m³	94	t	3.28	g/s
		NOx	574	mg/m³	14.8	t	0.52	g/s
		PM10	135	mg/m³	17,388	kg	606	mg/s
		CO2		mg/m³	842,000	kt	29.4	kg/s
A203 LCP343	TBH 5 & 6 BOILERS	Particulates	159	mg/m³	14,812	Kg	501	mg/s
		SO2		mg/m³	67.5	T	2.28	g/s
		NOx	616	mg/m³	10.6	T	0.36	g/s
		PM10	159	mg/m³	14,812	Kg	501	mg/s
		CO2	-	mg/m³	688,000	Kt	23.2	kg/s

Releases to Water

Water released from the process includes bleed off from the cooling tower, boiler blow-down and surface water or roof drainage. Low level basements are fitted with drainage collection sumps, from which any water is directed into soakaways and into the drainage system.

The discharges from the CPS and TBH form part of consented discharge W1 (Seraphim Lagoon to Brumby Beck).

Small amounts of chemical are used at both CPS and TBH and could potentially enter the plant drains. Spillages of fuel oil or lubrication oil, if not contained, could enter the drains and flow through to Brumby Remine or Seraphim Lagoon. Intermediate interceptor and skimming infrastructure, together with supervision of open water systems, are present at key

locations to minimise the risk of oil being discharged into the environment.

Releases to Land

With the exception of general waste skips, there are no direct releases to land from normal operations. Periodic replacement of refractory material or cooling tower timber packing is handled specifically to minimise landfill.

Spillage or replacement of asbestos, primarily at the TBH, is handled by specialist contractors and any waste asbestos is disposed of as hazardous waste to suitably authorised landfill sites.

Total materials for landfill are unlikely to exceed 75 tonnes/year.

SPG 3.4 Section deleted

SPG 3.5 Noise

Both of the stations are potentially major sources of noise, either from fugitive releases of high pressure steam during plant start-ups or shutdowns or due to periodic blowing air releases at TBH when blowers are not blowing to the process or for blower protection. Silencers are fitted on the air release points to minimise the impact at the boundary and steam releases are usually directed internally to the site.

Both stations are treated as noise hazard areas within the buildings.

Further details can be found in Section 2.9.

SPG 4 EMISSION CONTROL AND ABATEMENT

SPG 4.1 Control of Releases to Air

Fuel Policy

There is an intrinsic policy to preferentially use the arising fuels from other site processes, in particular the gas produced at the blast furnaces. This best avoids wasteful bleed of gas and maximises the energy efficiency of the integrated production route. Natural gas is purchased and mixed with blast furnace gas to create a synthetic coke oven gas of the same CV to traditional coke oven gas, which is no longer available at Scunthorpe.

Heavy fuel oil is used for security. The use of heavy fuel oil is carefully controlled to ensure that there is adequate dilution in emissions from the stack, except where this would conflict with maintaining site security of steam, blowing or electricity supplies. Heavy fuel oil is preferentially used at the CPS, where there is a higher stack for dispersion.

General Combustion Control

The combustion of the fuels used in the multi-fuel fired boilers is continuously monitored and adjusted to ensure that the correct air to fuel ratios are achieved and to maintain boiler superheat. On-line combustion product analysis includes carbon monoxide, oxygen and obscuration due to smoke or particulates, especially when firing fuel oil.

Sulphur Dioxide

The emission of sulphur dioxide results from quantities of sulphur in the fuels for combustion. Since these quantities remain relatively fixed for each fuel the amount of SO_2 released can be calculated from the total amount of each fuel burnt over a period. Shift, period and annual releases can be calculated and concentration levels are trended.

The largest source of sulphur is from heavy fuel oil and thus the sulphur content of purchased fuel oil is regularly monitored. The storage tank contents and deliveries are sampled and analysed and trended on a month-by-month basis to ensure the fuel oil used is below the agreed sulphur content. The mean sulphur content is controlled to 1.0%.

Oxides of Nitrogen

Oxides of nitrogen (principally nitric oxide NO and nitrogen dioxide NO_2), commonly called NOx, are formed in all combustion processes. The NOx can form directly from nitrogen in the fuel, by fixation of nitrogen in the combustion air and through ‘prompt NOx’ where nitrogen is converted to NO via intermediate products in the flame front with participation of reaction hydrocarbons.

Although fuel nitrogen is higher in the works arising gases, the highest concentrations of NOx are formed when burning oil. Aside from intrinsic factors such as boiler or burner designs the control of NOx rests principally with minimising oil usage and then in careful control of the levels of excess air used on boilers on oil. Tests have supported earlier guidance that this has its limits, as reducing excess air to minimise NOx can adversely affect particulate formation.

Particulates

Particulates arise from two sources, either due to dust in the incoming works arising gases or through the incomplete combustion of heavy fuel oil. The latter being the most significant source. The works gases are scrubbed local to their source.

Particulates arising from combustion of fuel oil are primarily controlled by attention to the excess air level, the higher the better. High excess air can, of course, result in NOx formation and generally lower overall efficiency.

Secondary factors resulting in particulate formation are the burner tip condition, atomising steam conditions and oil conditions (viscosity, temperature, pressure) and these are controlled to manufacturers recommendations.

NOx/Particulate Tests

Tests on the dependence of NOx and particulate formation on the levels of excess air have been carried out for both 'normal' and 'Low NOx' burner tips, with results described in the submission for Improvement Condition No.11 in Table 8.1 of the IPC authorisation.

SPG 4.2 Control of Releases to Water

General cooling tower bleed-off and boiler blow-down water is discharged to drain locally. This combines with other plant discharges and site drainage and flows through settlement lagoons prior to discharge via consented outlet W1. Water quality is continuously monitored both locally and centrally and discharge pumping can be stopped, while remedial action is being taken.

Storage tanks for heavy fuel oil are bunded to avoid any spillage entering drains. Occasional oil spills outside the bunds are dealt with using absorbent materials locally or in the worst case 'gulped' from the surface of the intermediate lagoons to avoid discharge to the local water courses. Interceptors and skimmers are also installed.

Water treatment chemicals used in the boilers and in the cooling system are stored in bunded tanks and handled by trained personnel.

SPG 4.3 Control of Releases to Land

Waste is managed via the works' waste contract. There is minimal landfill disposal, with most wastes being recycled or recovered as RDF through a third-party waste management

contractor.

SPG 5 CONTROL SYSTEMS

Management Structures

Front-line operations are carried out by the shift teams, who operate on a 24 hour 7 day a week continuous basis at both the CPS and TBH. They have the responsibility to ensure that all equipment is operated safely and to agreed procedures, including requirements to control emissions.

The CPS and TBH also have dedicated day management support teams, who oversee the operation of the process, ensure that equipment is maintained and develop the process and/or plant.

The Manager Energy Operations ensures that all operations and maintenance are carried out safely, efficiently and effectively to ensure plant essential services are secure. He/she also establishes operational policy and ensures that maintenance and other requirements fulfil British Steel policy and legislative requirements.

Training

All personnel receive training and testing to suit the responsibilities and competence requirements of the role. Front-line shift personnel undergo extensive plant and procedural training under the supervision of existing staff. The team leaders are trained in the basic supervisory and coaching skills required.
Specific environmental requirements of operations are covered by procedures and all staff are trained in their application
All operational staff are encouraged to learn more about the processes they are operating and several personnel have attended Power Plant Operations courses and achieved City & Guilds qualifications.

All managers receive both managerial and technical training for the role. The majority of managers have attended Environmental awareness seminars.

Communications/Reporting

Each shift team and the Shift Manager complete a report for their area of responsibility at the end of each shift. This will include general operational reports and, by exception, any significant problems, environmental releases or process excursions. The shift teams have the capability to resolve many equipment issues, but also have the ability to request attention to equipment problems from day support personnel, through a SAP based work note system.

Major operational or engineering issues are raised at a weekly management meeting, chaired by the Shift Manager. Actions for progressing outstanding issues are determined and

allocated. The actions list is formally updated on a weekly basis.

ISO14001/COMAH

The Energy Operations department contributes toward the ISO14001-accreditated environmental management system..

As required by legislation, the Energy Operations department also contributes to the development and implementation of the works' COMAH arrangements.

Control & Monitoring Equipment

The processes at both CPS and TBH are extensively instrumented and have modern process control systems providing automatic or semi-automatic control of the process. Each plant has a central control room, providing supervisory information, facilities for remote operation, alarms and monitoring for the operators.

Each boiler is provided with a stack analysis measurement for NOx, SOx, CO, CO_2, O_2 and particulate . This forms part of a combustion control system to provide optimum combustion and minimise waste products.

SPG 6 OPERATING AND MAINTENANCE PROCEDURES

Operating Procedures

Procedures are established for all significant operations of boiler, turbine and ancillary plant. Typical procedures cover activities such as fuel changes, load changes, soot blowing and taking units in or out of service. Specific examples of operational procedures are detailed in earlier sections.

Maintenance Procedures

A register of all plant equipment is held on the business-wide SAP system. This system also holds the planned maintenance schedules, job catalogues and plant/job history.

A number of plant items, including the boiler water/steam circuits are governed directly by statutory requirements, including the Pressure Systems Regulations. Thus key equipment is regularly inspected by an independent Competent Engineer and Written Schemes of Examination are in place.

Each boiler and turbine is regularly maintained and overhauled, in line with manufacturer's recommendations and/or the experience and knowledge of the department's engineers. Specific attention is paid to burners, gas systems, oil systems and process control devices. In addition each measurement device is regularly calibrated and loop tested.

The stack analysis equipment is regularly calibrated and maintained as required.

SPG 7 ABNORMAL OPERATION AND PLANT START-UP

Operational procedures are in place for start-up or shutdown of all plant items. This includes changes of fuel, establishing oil burners, warming-up boilers/turbines, shutting plant down or bringing plant into operation.
Specific attention is paid to environmental releases during start-up activities, particularly to air and during periods of establishing oil firing.

Abnormal plant operations, by their very nature, tend to occur infrequently, often as a result of an equipment trip or a process upset.
Many situations are covered by contingency procedures e.g. opening up Pressure Reducing Desuperheating Stations (PRDSs) in the event of a turbine trip or establishing oil firing on the boilers in the event of a loss of gas supplies.
The more complex events rely on trained and competent personnel to prioritise and determine actions to safeguard personnel and plant and to mitigate the effects to plant consumers.

APPENDIX SPG 1

Details of Boilers and Burners

Boiler Capacities and Firing Rates

	Boiler Number	Installed Capacity (MWth)	Energy Input SCOG m3/hr	Energy Input Blast Furnace Gas m3/hr	Energy Input Fuel Oil t/hr
			Firing Limits	Firing Limits	Firing Limits
Central Power Station	1	108	16,400	90,000	9.8
	2	108	16,400	90,000	9.8
Total		**265**	**33,300**	**216,000**	**23.6**
Turbo Blower House	1	39	360	28,000	3.4
	2	39	360	28,000	3.4
	3	39	360	28,000	3.4
	4	39	360	28,000	3.4
	5	54	540	42,000	5.1
	6	54	540	42,000	5.1
Total		**264**	**2,520**	**196,000**	**23.8**
Grand Total		**529MWth**			

CENTRAL POWER STATION

Boilers 1 and 2

Manufactured by NEI Derby. Type V-U 60. Date of installation 1976.
Main fuels. Heavy fuel oil, SCOG, MEG and blast furnace gas.
Start-up burners natural gas pilot burners.
Steam pressure 62 bar, steam temperature 485^{0}C.
5 Heavy Fuel Oil burners.
Manufacturer NEI. Throughput per burner 1.8 tonnes/hour.
8 combined blast furnace gas/MEG and SCOG burners per boiler.
Throughput per burner, blast furnace gas 11250 m^3 /hr, coke oven gas 2000 m^3 /hr (these figures are approximate).
Gas pilot burners, 4 per boiler, throughput 300 m^3 /hr each.
Control system ABB Mod 30/Chartertech (as from Sept 2001).

TURBO BLOWER HOUSE

Boilers 1 to 4

Manufactured by John Thompson Limited. Type Etaflo. Date of installation 1953.
Main fuels. Heavy fuel oil and blast furnace gas.
Start-up burners natural gas.
Steam pressure 31 bar, steam temperature 405^0C.
4 Heavy fuel oil burners.
Manufacturer Hamworthy. Type DF 505. Throughput 0.85 tonne/hr.
4 blast furnace gas burners.
Manufacturer British Combustion Engineering Limited. Type Typhoon.
Throughput 7000 m^3 /hr.
Control system Emmerson Delta V

Boilers 5 and 6

Manufactured by John Thompson Limited. Type Etaflo.
Date of installation No. 5 - 1953, No. 6 - 1961.
Main fuels. Heavy fuel oil and blast furnace gas.
Start-up burners natural gas.
Steam pressure 31 bar, steam temperature 405ºC.
6 Heavy fuel oil burners.
Manufacturer Hamworthy. Type DF 505.
Throughput 0.85 tonne/hr.
6 Blast furnace gas burners.
Manufacturer British Combustion Engineering Limited. Type Typhoon.
Throughput 7000 m^3 /hr.
Control system Emmerson Delta V