Environment Agency

Review of an Environmental Permit for an Installation subject to Chapter II and III of the Industrial Emissions Directive under the Environmental Permitting (England & Wales) Regulations 2010 (as amended)

Consultation on our decision document recording our decision-making process following review of a permit

The Permit number is: EPR/HP3736AW
The Operator is: Longs Steel UK Limited
The Installation is: Scunthorpe Integrated Iron & Steelworks, Brigg Road, Scunthorpe
This Variation Notice number is: EPR/HP3736AW/V003

Consultation commences on: 23rd December 2015
Consultation ends on: 31st January 2016

What this document is about

Article 21(3) of the Industrial Emissions Directive (IED) requires the Environment Agency to review conditions in permits that it has issued and to ensure that the permit delivers compliance with relevant standards, within four years of the publication of updated decisions on BAT conclusions.

We have reviewed the permit for this installation against the revised BAT Conclusions for the iron and steel production industry sector published on 8th March 2012. This is our decision document, which explains the reasoning for the draft consolidated variation notice that we are issuing.

It explains how we have reviewed and considered the techniques used by the Operator in the operation and control of the plant and activities of the installation. This review has been undertaken with reference to the decision made by the European Commission establishing best available techniques (BAT) conclusions ('BAT Conclusions') for Iron and Steel Production as detailed in document reference C(2012) 903. It is our record of our decision-making process and shows how we have taken into account all relevant factors in reaching our position. It also provides a justification for the inclusion of any specific conditions in the permit that are in addition to those included in our generic permit template.

As well as considering the review of the operating techniques used by the Operator for the operation of the plant and activities of the installation, the draft consolidated variation notice takes into account and brings together in a single document all previous variations that relate to the original permit issued. It also modernises the entire permit to reflect the conditions contained in our current generic permit template.

The introduction of new template conditions makes the Permit consistent with our current general approach and philosophy and with other permits issued to installations in this sector. Although the wording of some conditions has changed, while others have been removed because of the new regulatory approach, it does not reduce the level of environmental protection achieved by the Permit in any way. In this document we therefore address only our determination of substantive issues relating to the new BAT Conclusions.

We are also reviewing all Environmental Permits (including this one) which permit the operation of large combustion plant (LCP), as defined by articles 28 and 29 of the Industrial Emissions Directive (IED), to vary the permit to implement the special provisions for LCP given in the IED, by the 1 January 2016 (Article 82(3)). The IED makes special provisions for LCP under Chapter III, introducing new Emission Limit Values (ELVs) applicable to LCP, referred to in Article 30(2) and set out in Annex V.

The IED provides a period of transition towards the new ELVs via Article 32, the Transitional National Plan (TNP). It also makes provision for plant that wish to be exempted from compliance with the new ELVs in Article 33, the Limited Life Derogation (LLD).

We have reviewed the operator's additional information response to our regulation 60(1) notice under the Environmental Permitting Regulations (EPR), which has provided us with information on which compliance route they wish to follow for each LCP. The response also includes specific details relating to each LCP, necessary for accurate implementation of the IED requirements. A copy of the regulation 60 notice and the operator's response is available on the public register.

It explains how we have reviewed and considered the compliance routes and, where relevant, the emissions limits proposed by the Operator for each LCP on the installation. This review has been undertaken with reference to the:

- Chapter III and annex V of the IED
- "IED BAT ESI Review Paper, 28 October 2014" produced by the Environment Agency (referred to as the "2014 ESI BAT review paper" in this document)

- "IED BAT Non-ESI Review Paper, 28 October 2014" produced by the Environment Agency (referred to as the "2014 Non-ESI BAT review paper" in this document)

- "Electricity Supply Industry – IED compliance protocol for utility boilers and gas turbines" published by the Joint Environmental Programme.

We have also considered an application from the operator to undertake the physico-chemical treatment of hazardous waste (namely oily millscale) for the purpose of recovery (R4).

This is our record of our decision-making process and shows how we have taken into account all relevant factors in reaching our position.

Throughout this document we will use a number of expressions. These are as referred to in the glossary and have the same meaning as described in "Schedule 6 Interpretation" of the Permit.

The document is in draft at this stage, because we have yet to make a final decision. Because the proposed permit contains derogations from compliance with some of the BAT-AELs set out in the BAT Conclusions document, the IED requires us to explain our thinking to the public and other interested parties before we make this decision, to give them a chance to understand that thinking and, if they wish, to make relevant representations to us. We will make our final decision only after carefully taking into account any relevant matter raised in the responses we receive. Our mind remains open at this stage: although we believe we have covered all the relevant issues and reached a reasonable conclusion, our ultimate decision could yet be affected by any information that is relevant to the issues we have to consider. However, unless we receive information that leads us to alter the conditions in the draft Consolidated Variation Notice, or to reject the Application altogether, we will issue the Notice in its current form.

In this document we frequently say "we have decided". That gives the impression that our mind is already made up; but as we have explained above, we have not yet done so. The language we use enables this document to become the final decision document in due course with no more re-drafting than is absolutely necessary.

We try to explain our decision as accurately, comprehensively and plainly as possible. We would welcome any feedback as to how we might improve our decision documents in future. A lot of technical terms and acronyms are inevitable in a document of this nature: we provide a glossary of acronyms near the front of the document, for ease of reference.

Preliminary information and use of terms

During the permit review the permit held by Tata Steel UK Limited was transferred in full to Longs Steel UK Limited, a wholly-owned subsidiary of Tata Steel UK Limited on 2nd August 2015. This has had no practical impact on the regulation of the site. The steelworks is being operated in the same manner, which includes carrying forward all proposed improvements and associated timelines to meet the revised standards in BAT Conclusions for the Production of Coke Iron and Steel, along with Chapter III and Annex V to the IED made under the name of Tata Steel UK Limited. As such the use of the name Tata or Longs Steel should be seen as being interchangeable.

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Glossary of acronyms used in this document

(Please note that this glossary is standard for our decision documents and therefore not all these acronyms are necessarily used in this document.)

AAD	Ambient Air Directive (2008/50/EC)
APC	Air Pollution Control
BAT	Best Available Technique(s)
BAT-AEL	BAT Associated Emission Level
BATc	BAT conclusion
BREF	Best available techniques reference document
CEM	Continuous emissions monitor
CHP	Combined heat and power
COMEAP	Committee on the Medical Effects of Air Pollutants
CROW	Countryside and rights of way Act 2000
CV	Calorific value
DAA	Directly associated activity – Additional activities necessary to be carried out to allow the principal activity to be carried out
DD	Decision document
Derogation	from BAT AELs stated in BAT Conclusions under specific circumstances as detailed under Article 15(4) of IED where an assessment shows that the achievement of emission levels associated with the best available techniques as described in BAT conclusions would lead to disproportionately higher costs
EAL	Environmental assessment level
EIONET	European environment information and observation network is a partnership network of the European Environment Agency
ELV	Emission limit value derived under BAT or an emission limit value set out in either IED
EMS	Environmental Management System
EPR	Environmental Permitting (England and Wales) Regulations 2010 (SI 2010 No. 675) as amended
EQS	Environmental quality standard
EU-EQS	European Union Environmental Quality Standard
Eunomia	Ballinger, Holland & Hogg (2011) Use of Damage Cost Data for BAT Decision Making: Report for the Environment Agency of England & Wales
EWC	European waste catalogue
FGD	Flue Gas Desulphurisation
FSA	Food Standards Agency
GWP	Global Warming Potential
HMT GB	Her Majesty's Treasury The Green Book - Appraisal and Evaluation in Central Government
HW	Hazardous waste
IED	Industrial Emissions Directive (2010/75/EU)
IPPCD	Integrated Pollution Prevention and Control Directive (2008/1/EC) – now superseded by IED
I-TEF	Toxic Equivalent Factors set out in Annex VI Part 2 of IED
I-TEQ	Toxic Equivalent Quotient calculated using I-TEF
LADPH	Local Authority Director(s) of Public Health
LCP	Large Combustion Plant subject to Chapter III of IED

LCPD	Large Combustion Plant Directive (2001/80/EC) – now superseded by IED
MSUL/MSDL	Minimum start up load/minimum shut-down load
NOx	Oxides of nitrogen (NO plus NO_2 expressed as NO_2)
PAH	Polycyclic Aromatic Hydrocarbons
PC	Process Contribution
PEC	Predicted Environmental Concentration
PHE	Public Health England
POP(s)	Persistent organic pollutant(s)
PPS	Public participation statement
PR	Public register
PXDD	Poly-halogenated di-benzo-p-dioxins
PXB	Poly-halogenated biphenyls
PXDF	Poly-halogenated di-benzo furans
RGS	Regulatory Guidance Series
SAC	Special Area of Conservation
SGN	Sector guidance note
SHPI(s)	Site(s) of High Public Interest
SPA(s)	Special Protection Area(s)
SSSI(s)	Site(s) of Special Scientific Interest
TDI	Tolerable daily intake
TEF	Toxic Equivalent Factors
TGN	Technical guidance note
TOC	Total Organic Carbon
TNP	Transitional National Plan
US EPA	United States Environmental Protection Agency
WFD	Waste Framework Directive (2008/98/EC)
WHO	World Health Organisation

1 Our proposed decision

We are minded to issue the Consolidated Variation Notice to the Operator. This will allow it to continue to operate the Installation, subject to the conditions in the Consolidated Variation Notice.

As part of our proposed decision we have decided to grant the Operator's request for a derogation from the requirements of BAT Conclusion(s) 48, 49, 50 and 51 as identified in the Coke, Iron and Steel Production BAT Conclusions document. The way we assessed the Operator's requests for derogation and how we subsequently arrived at our conclusion is recorded in Annex 2 of this document.

We consider that, in reaching that decision, we have taken into account all relevant considerations and legal requirements and that the varied permit will ensure that a high level of protection is provided for the environment and human health.

The draft Consolidated Variation Notice contains many conditions taken from our standard Environmental Permit template including the relevant Annexes. We developed these conditions in consultation with industry, having regard to the legal requirements of the Environmental Permitting Regulations and other relevant legislation. This document does not therefore include an explanation for these standard conditions. Where they are included in the Notice, we have considered the techniques identified by the operator for the operation of their installation, and have accepted that the details are sufficient and satisfactory to make those standard conditions appropriate. This document does, however, provide an explanation of our use of "tailor-made" or installation-specific conditions, or where our Permit template provides two or more options.

2 How we reached our draft decision

2.1 Requesting information to demonstrate compliance with BAT Conclusions for Iron and Steel Production

We issued a Notice under Regulation 60(1) of the Environmental Permitting (England and Wales) Regulations 2010 (a Regulation 60 Notice) on 07/06/13 requiring the Operator to provide information to demonstrate how the operation of their installation currently meets, or will subsequently meet, the revised standards described in the relevant BAT Conclusions document. The Notice also required that where the revised standards are not currently met, the operator should provide information that:

- Describes the techniques that will be implemented before 08/03/16, which will then ensure that operations meet the revised standard, or
- Justifies why standards will not be met by 08/03/16, and confirmation of the date when the operation of those processes will cease within the installation or an explanation of why the revised BAT standard is not applicable to those processes, or
- Justifies why an alternative technique will achieve the same level of environmental protection equivalent to the revised standard described in the BAT Conclusions.

Where the Operator proposed that they were not intending to meet a BAT standard that also included a BAT Associated Emission Level (BAT AEL) described in the BAT Conclusions Document, the Regulation 60 Notice requested that the Operator make a formal request for derogation from compliance with that AEL (as provisioned by Article 15(4) of IED). In this circumstance, the Notice identified that any such request for derogation must be supported and justified by sufficient technical and commercial information that would enable us to determine acceptability of the derogation request.

The Regulation 60 Notice response from the Operator was received on 27/09/2013.

We considered that the response did not contain sufficient information for us to commence the permit review. We therefore issued a further information request to the Operator on 27/09/2013. Suitable further information was provided by the Operator on 30/04/2014 and 11/08/2014.

We considered it was in the correct form and contained sufficient information for us to begin our determination of the permit review but not that it necessarily contained all the information we would need to complete that review: see below.

The Operator claimed that certain information was commercially confidential and should be withheld from the public register. We considered this request and determined that: Document BL3838_0792 and associated excel spreadsheet that contained the detailed costing information should be withheld from the public register as the release of this information would severely influence the outcome of tender process and the information meets the criteria in Regulation 51(c) (i), (ii) and (iii)

(i) The information is commercial
(ii) Its confidentiality is provided by law to protect a legitimate economic interest, and
(iii) In all the circumstances, the public interest in maintaining the confidentiality of the information outweighs the public interest in including it on the register.

A separate document Reference BL3838_0791 that includes cost data to support the justification of derogation request has been made available on the public register.

Apart from the issues and information just described, we have not received any information in relation to the Regulation 60 Notice response that appears to be confidential in relation to any party.

2.2 Review of our own information in respect to the capability of the installation to meet revised standards included in the BAT Conclusions document

Based on our records and previous regulatory activities with the facility we have no reason to consider that the operator will not be able to comply with the conditions that we include in the permit.

In relation to BAT Conclusion(s) 3, 8,10,11,16, 25, 26, 56, 59, 60 and 81 we agree with the operator in respect to their current stated capability as recorded in their Regulation 60 Notice response that improvements are required.

We have therefore included an improvement condition IC1 in the Consolidated Variation Notice, which requires them to upgrade their operational techniques so that the requirements of the BAT Conclusion are delivered by 8th March 2016. This is discussed in more detail in Annex 1.

2.3 Requesting information relating to the requirements of Chapter III of and Annex V to the IED

We issued a Notice under Regulation 60(1) of the Environmental Permitting (England and Wales) Regulations 2010 (a Regulation 60 Notice) on 17/02/15 requiring the Operator to provide information for each LCP they operate, including:

- The type of plant, size and configuration,
- The proposed compliance route
- Minimum start up and shut down loads
- The proposed emission limits and how they accord with the 2014 BAT review paper,

The Regulation 60 Notice response from the Operator was received on 27/02/15. We considered that the response did not contain sufficient information regarding minimum start up and shut down loads and the thermal rating of the LCP plants. We therefore issued a further information request to the Operator on 28/09/2015. A part response was provided by the Operator on 12/10/2015 relating to the minimum start up and shut down loads .The Operator made no claim for commercial confidentiality. We have not received any information in relation to the Regulation 60 Notice responses that appears to be confidential in relation to any party.

2.4 Addition of a new listed activity

During our metal sector review a variation application was received in May 2015 to undertake the physico-chemical treatment of hazardous waste (namely the handling and treatment of oily millscale) for the purpose of recovery (R4). The application was publicised in accordance with our PPS. No comments were received from members of the public or other interested parties.

We consider that that application was in the correct form and contained sufficient information for us to determine whether those activities could be included in the permit as part of the review process.

We believe the operator has taken steps to prevent pollution of the environment or harm to human health from these particular activities, we consider the best available techniques are being used to manage these waste streams and the activities can be included in the permit as requested.

2.5 Summary of Our Considerations

Having carefully considered the Regulation 60 Notice responses and all other relevant information, we are now putting our draft decision before the public and other interested parties in the form of a draft Consolidated Variation Notice, together with this explanatory document.

We are now providing the public with an opportunity to comment on our proposed decision and conclusion to the Permit Review which includes our draft Consolidated Variation Notice and this decision document. We will consider all relevant representations we receive in response to this consultation and will amend this explanatory document as appropriate to explain how we have done this, when we publish our final decision.

3 The legal framework

The Consolidated Variation Notice will be issued, if appropriate, under Regulation 20 of the EPR. The Environmental Permitting regime is a legal vehicle which delivers most of the relevant legal requirements for activities falling within its scope. In particular, the regulated facility is:

- an *installation* as described by the IED;
- subject to aspects of other relevant legislation which also have to be addressed.

We consider that, if it is issued, the Consolidated Variation Notice will ensure that the operation of the Installation complies with all relevant legal requirements and that a high level of protection will be delivered for the environment and human health.

We explain how we have addressed specific statutory requirements more fully in the rest of this document.

We have set the ELV's in line with the BAT Conclusions, unless a tighter limit was previously imposed and these limits have been carried forward. The emission limits and monitoring tables have been incorporated into three Schedules:

Schedule 3(a) – Emissions Limits and Monitoring until 8th March 2016

These are the existing ELVs in the permit and previous variations consolidated into this permit variation and also now include new ELVs for the combustion units under the Transitional National Plan (TNP) under the IED which apply from 1st January 2016.

Schedule 3(b) – Emissions Limits and Monitoring from 8th March 2016

This version of the monitoring and emission requirements amends the ELVs for all emissions point affected by the BREF BATc AELs.

Schedule 3(c) – Emissions Limits and Monitoring from 1st July 2020

This version of the monitoring and emission requirements amends the ELVs for the combustion units under the Industrial Emissions Directive as the TNP period ends. The ELV's are set in accordance with Annex V of IED.

Meeting the requirements of Chapter III and Annex V of the IED

The table below shows how each requirement of the IED has been addressed by the permit conditions.

IED Article Reference	IED requirement	Permit condition
30(6)	If there is an interruption in the supply of gas, an alternative fuel may be used and the permit emission limits derogated from any derogation shall not exceed 10 days, except where there is an overriding need to maintain energy supplies. The EA shall be notified immediately.	Not applicable
32(4)	For installations that have applied to derogate from the IED Annex V emission limits by means of the transitional national plan, the monitoring and reporting requirements set by UK Government shall be complied with.	3.1.3 Schedule 3(a), 3(b), and 3(c), Table S3.7
33(1)b	For installations that have applied to derogate from the IED Annex V emission limits by means of the Limited Life Derogation, the operator shall submit annually a record of the number of operating hours since 1 January 2016	Not applicable
37	Provisions for malfunction and breakdown of abatement equipment including notifying the EA.	No abatement equipment fitted
38	Monitoring of air emissions in accordance with Annex V Pt 3	3.5, 3.6
40	Multi-fuel firing	Schedule 3(a), 3(b), and 3(c) Table 3.6
41(a)	Determination of start-up and shut-down periods	2.3.3 Schedule 1 Table S1.4
72b	For combustion plants which do not operate more than1500 operating hours per year as a rolling average over a period of 5 years, the number of operating hours per year.	Not applicable
Ann V Pt 1(1)	All emission limit values shall be calculated at a temperature of 273.15 K, a pressure of 101.3 kPa and after correction for the water vapour content of the waste gases and at a standardised O2 content of 6 % for solid fuels, 3 % for combustion plants, other than gas turbines and gas engines using liquid and gaseous fuels and 15 % for gas turbines and gas engines.	Schedule 6, Interpretation
Ann V Pt 1	Emission limit values	3.1.2 Schedule 3(a), 3(b) & 3(c), Table S3.6
Ann V Pt 1	For plants operating less than 500 hours per year, record the used operating hours	Not applicable
Ann V Pt 1(6(1))	Definition of natural gas	Schedule 6, Interpretation
Ann V Pt 2	Emission limit values	3.1.2 Schedule 3(a) & 3(b),Table S3.6

IED Article Reference	IED requirement	Permit condition
AnnV Pt 3(1)	Continuous monitoring for >100MWth for specified substances	3.5, 3.6 Schedule 3(a), 3(b) & 3(c),Table S3.6
AnnV Pt 3(2, 3, 5)	Monitoring derogations	3.5.1 Schedule 3(a), 3(b) & 3(c),Table S3.6
AnnV Pt3(4)	Measurement of total mercury	3.5.1 Schedule 3(a), 3(b) & 3(c),Table S3.6
AnnV Pt3(6)	EA informed of significant changes in fuel type or in mode of operation so can check Pt3 (1-4) still apply	2.3.1 Schedule 1, Table S1.2
AnnV Pt3(7)	Monitoring requirements	3.5.1 Schedule 3(a), 3(b) & 3(c),Table S3.6
AnnV Part 3(8,9,10)	Monitoring methods	3.5, 3.6
AnnV Pt 4	Monthly, daily, 95%ile hourly emission limit value compliance	3.5.1, 3.6.7 Schedule 3(a), 3(b) & 3(c),Table S3.6
AnnV Pt7	Refinery multi-fuel firing SO_2 derogation	Not applicable

4 Key Issues

The key issues arising during this permit review are:

- The review and assessment of the derogation applications from meeting BATs 48, 49, 50 and 51
- Emission to water particularly in the setting of tighter water quality limits to minimise waste water discharge to controlled waters in line with BAT 56, 67 and 81
- BAT 11 reducing diffuse dust emissions

We therefore describe how we determined these issues in most detail in the relevant sections of this document.

5 Decision checklist regarding relevant BAT Conclusions

BAT Conclusions for the Production of Iron Steel, were published by the European Commission on 8th March 2012. There are 95 BAT Conclusions.

This annex provides a record of decisions made in relation to each relevant BAT Conclusion applicable to the installation. This annex should be read in conjunction with the Consolidated Variation Notice.

The overall status of compliance with the BAT conclusion is indicated in the table as:

NA Not Applicable
CC Currently Compliant
FC Compliant in the future (within 4 years of publication of BAT conclusions)
NC Not Compliant

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
General			
1	BAT is to implement and adhere to an environmental management system (EMS)	CC	Operate in accordance with an ISO14001 accredited EMS which is fully in line with BAT.
2	BAT is to reduce thermal energy consumption by using a combination of techniques. I. improved and optimised systems to achieve smooth and stable processing, operating close to the process parameter set points II. recovering excess heat from processes, especially from their cooling zones III. an optimised steam and heat management IV. applying process integrated reuse of sensible heat as much as possible.	CC	In the initial response Tata Steel did not address each of the subsections of the BAT conclusions, the response on the 30/04/14 they confirmed the following: BAT I. All major processes are controlled by means of computer-based systems to ensure safe operation and to achieve the most efficient overall steel production, taking into account the integrated nature of Scunthorpe steelworks, the dependence of each process on the preceding processes and market demand for steel products. Energy consumption data are gathered automatically for the various processes around the site and compared with benchmark targets derived from best practice/best historical practice. Within the Tata Steel Group, there is in place a state-of-the-art system, which is believed to be unique in the industry that gathers required data to report energy consumption and CO_2 emissions for every major process site (globally). This system also compares the performance of each process on each site against a best practice performance and analyses the cause of deviations from best practice to identify improvement opportunities. With the exception of the sinter plant strands, all fuels used on site are presented in liquid or gaseous form. At the sinter plant, carbon (typically in the form of coke breeze) is added to the raw mix in order to fuel the sintering process. Breeze is added to the raw mix via constant rate feeders, the process is closely monitored and the amount controlled in order to minimise the use of breeze, which is the sinter plants most expensive raw material. Preheating is undertaken where viable; steel stock is preheated in reheating furnace recuperation zones, combustion air is preheated using recuperators and boiler feed water is preheated in the Central Power Station and Turbo Blower House. All the reheating furnaces are fired with process-arising gases and include an un-fired recuperation zone to preheat the stock using the furnace exhaust gases, before the waste gases are passed to recuperators for further heat recovery by preheating combustion air. Steam and hot water pipes are lagged to minimise energy losses.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
			BAT II With the exception of the sinter plant strands, all fuels used on site are presented in liquid or gaseous form. At the sinter plant, carbon (typically in the form of coke breeze) is added to the raw mix in order to fuel the sintering process. Breeze is added to the raw mix via constant rate feeders, the process is closely monitored and the amount controlled in order to minimise the use of breeze, which is the sinter plants most expensive raw material. BATIII. Utilise a manned Energy Control Centre and dedicated Energy Operations Department responsible for collecting and distributing process-arising gases in the most efficient manner to ensure optimum energy consumption and optimum steam and heat management across the site. BATIV. Operate an integrated reuse of sensible heat, such as combined heat and power operation of excess medium pressure steam from the power plant, which is used to drive the coke oven gas exhausters in the coke oven by-product plants. The resulting low pressure steam from the exhausters is then used for stripping in the ammonia and benzole strippers. Thereby, the total (pressure and heat) energy of steam is utilised in a cascaded manner, optimising the utilisation according to the sensible heat and pressure levels required by the operations.
3	BAT is to reduce primary energy consumption by optimisation of energy flows and optimised utilisation of the extracted process gases such as coke oven gas, blast furnace gas and basic oxygen steel making gas.	FC	The site currently has one gas holder in operation for each of the works arising gases i.e. Blast Furnace Gas, Coke Oven Gas (for Dawes Lane Coke Ovens) and BOS Gas. A capital submission is being prepared for a replacement Coke Oven Gas holder to serve Appleby Coke Ovens, to replace the one that was taken out of service recently. This facility will be required before any maintenance can be carried out on the Dawes Lane gas holder, and is phased in the unapproved capital plan for installation before 2016. We have included an improvement condition (IC1) to ensure that the gas holder is replaced. Increasing pressure in the grid is only applicable to networks which operate at relatively high pressure. The Scunthorpe gas distribution networks operate at a maximum of only 200mb and all the consuming units are designed to operate at these low pressures.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
			• gas enrichment with process gases and different caloric values for different consumers is undertaken. Mixed Enhanced Gas (MEG) is produced by mixing Coke Oven Gas with Blast Furnace or BOS Gases and is used to fire the Mills reheating furnaces. A major capital investment scheme has also recently allowed MEG to be consumed at the Central Power Station, thereby reducing the volume of gas flared. This volume is also reduced by using the Central Power Station and Turbo Blower House to generate electricity. All reheating furnaces on the Scunthorpe site use arising gases as fuel. A combination of PLCs, gas chromatographs and mass spectrometers are used to optimise the energy performance at the various consuming units Temperature measurement by both automatic and manual means is a fundamental part of optimising the energy performance of gas consuming units. The methods used and temperatures taken are clearly dependent upon the type of plant concerned. In addition, the energy performance of each unit is monitored on a regular basis and a team of fuel engineers then works with the plant operations team to identify arising issues and apply the principle of continuous improvement in performance The energy recovery systems are designed to maximise the level of recovery achieved. This and the volume of gas flared, is monitored on a daily basis and improved where opportunities are identified.
4	BAT is to use desulphurised and dedusted surplus coke oven gas and dedusted blast furnace gas and basic oxygen gas (mixed or separate) in boilers or in combined heat and power plants to generate steam, electricity and/or heat using surplus waste heat for internal or external heating networks, if there is a demand from a third party.	FC	COG is dedusted within the respective by-products plants. The aim of the steelworks' energy network is to use **all** arising process gases (dedusted surplus coke oven gas, dedusted blast furnace gas and basic oxygen gas (mixed or separate) internally. Gas may be flared occasionally due to supply-demand imbalances caused by operational issues though this is an infrequent operation. We accept that the use of a third party agreement to utilise the flared gas is impractical. With the exception of desulphurisation of COG BAT is achieved. The desulphurisation of COG is not currently undertaken on site. See discussions under BAT48 and 49.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
5	BAT is to minimise electrical energy consumption by using one or a combination of the following techniques: I. power management systems II. grinding, pumping, ventilation and conveying equipment and other electricity-based equipment with high energy efficiency.	CC	Please refer to BAT 3 above. Energy reduction and energy management is part of the EMS. Conditions 1.2.1 of the consolidated Permit, requires the Operator to review energy efficiency on an ongoing basis and provide annual report energy usage and energy generated report under condition 4.2 and Schedule 5 I. power management systems A voltage optimisation programme was undertaken in 2008/09 to improve power management across the site. A number of key improvement areas have been initiated on rotating equipment. A programme of network transformer rationalisation is currently underway and a number of low-loaded units on multi-fed systems have already been identified and de-energised. A power monitoring system is in place as well as a dedicated team to manage the site electrical network & infrastructure II. grinding, pumping, ventilation and conveying equipment and other electricity-based equipment with high energy efficiency On-going programme to install variable speed and frequency control systems, along with the replacement of motors with high efficiency versions.
6	BAT is to optimise the management and control of internal material flows in order to prevent pollution, prevent deterioration, provide adequate input quality, allow reuse and recycling and to improve the process efficiency and optimisation of the metal yield.	CC	A internal material management plan is employed. See also BATc 8,9, 10 and 11

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
7	BAT is to select appropriate scrap qualities and other raw materials. Regarding scrap, BAT is to undertake an appropriate inspection for visible contaminants which might contain heavy metals, in particular mercury, or might lead to the formation of polychlorinated dibenzodioxins/furans (PCDD/F) and polychlorinated biphenyls (PCB).	CC	Operate to an approved scrap acceptance protocol for internal and external purchase of scrap on cleanliness and chemistry. This specifies the removal of mercury-containing WEEE & End-of-Life Vehicles. Radioactivity monitors are located on the scrap receipt weighbridges, through which the external scrap lorries must pass before discharging scrap on site. Radioactivity monitors are also fitted at the scrap bays. There are strict procedures around the detection of radioactive materials and subsequent response plan Scrap management at the BOS plant is managed by a contract with Harsco Metals. Harsco has a scrap inspector and work instructions for monitoring composition and standard of scrap. When scrap does not meet the standard of the BOS criteria, scrap is quarantined and the supplier is investigated. Investigations are documented. • The scrap bay is canopy-covered with a concrete base and dividing bay walls. • All internally generated scrap is recycled where composition and volume allows
8	BAT for solid residues is to use integrated techniques and operational techniques for waste minimisation by internal use or by application of specialised recycling processes (internally or externally).	FC	Document BAT8 – Fate of Solid Resides.doc lists solid residues and their fate. The waste hierarchy is used for determination of recovery and recycling. Internal arising solid materials are extensively re-circulated within the plant with the result that only a small proportion of total material arising (typically <5%) requires to be disposed of. Tata are currently reviewing the storage arrangement to ensure fugitive dust emissions are reduced and improvement condition has been set IC1 to ensure improvements are made. See BAT 11

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
9	BAT is to maximise external use or recycling for solid residues which cannot be used or recycled according to BAT 8, wherever this is possible and in line with waste regulations. BAT is to manage in a controlled manner residues which can neither be avoided nor recycled.	CC	Due to the nature of the integrated steel works and the recyclability of Iron and Steel residues, the vast majority of solid residue materials arising at Scunthorpe are already "reverted", i.e. consumed back within the process internally, as described in response to BAT 8. Iron oxide produced from both the blast furnaces and BOS plant is sold into the cement industry for trimming cement kiln chemistry. Processing of mill sludges by thermal desorption takes place to reduce the oil content and the clean material is returned back to the sinter plant process in the UK at the Scunthorpe site. The small fraction of residues that have no economic use are disposed of either at an internal landfill site or externally. In all cases we are satisfied that appropriate measures are being to ensure that such disposals are properly controlled. BAT is achieved
10	BAT is to use the best operational and maintenance practices for the collection, handling, storage and transport of all solid residues and for the hooding of transfer points to avoid emissions to air and water.	FC	The ongoing improvement programmes and capital investments is discussed in the response to BAT 11, prioritised to tackle the sources with the greatest impact, will achieve BAT by 2016. As solid residues are treated in the same way as raw materials, how the materials are treated, handled and stored is discussed in BAT 11
11	BAT is to prevent or reduce diffuse dust emissions from materials storage, handling and transport	FC	There are two local Air Quality Management Areas (AQMA) that have been declared for Particulate Matter emissions, specifically PM_{10}: Scunthorpe AQMA for daily exceedances which incorporates the east part of the town and adjacent to the steelworks; and Lower Santon AQMA, a small area of land north-west of the steelworks surrounding 3 houses for annual exceedance. Most of the PM_{10} emissions come from site operations such as traffic movements, poorly landscaped areas and storage and handling of materials such as coal, coke, slags, recycled materials and iron ore, rather than the process releases from point sources. Tata Steel have undertaken a number of measures for the prevention or reduction of diffuse dust emissions from materials storage, handling and transport. We have seen an improvement in air quality at the air quality monitoring stations but further improvements are needed.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
			We have been working with Tata to agree an Air Quality Management plan that deals with both point sources and diffuse dust sources but this is yet to be agreed. We have included new permit conditions (3.7) to ensure that the appropriate air quality management plan will be in place for the whole site. This plan will be a dynamic document and require annual review.
12	BAT for waste water management is to prevent, collect and separate waste water types, maximising internal recycling & using an adequate treatment for each final flow.	CC	Waste water management is part of the EMS. Long-standing constraints on water abstraction at Scunthorpe mean that the site is already highly efficient in terms of water use, utilising closed-loop systems in preference to once through systems wherever possible, and maximising the reuse of process waters where practicable, taking into account water quality and the distance between different processes. See also response to BAT 27, 53, 54 , 66 and 80
13	BAT is to measure or assess all relevant parameters necessary to steer the processes from control rooms by means of modern computer-based systems in order to adjust continuously and to optimise the processes online, to ensure stable and smooth processing, thus increasing energy efficiency and maximising the yield and improving maintenance practices.	CC	All major processes are controlled by means of computer-based systems to ensure safe operation and to achieve the most efficient overall steel production, taking into account the integrated nature of Scunthorpe steelworks, the dependence of each process on the preceding processes and market demand for steel products.

<table>
<tr><th>BAT Conclusion No</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th></tr>
<tr><td>14</td><td>BAT is to measure the stack emissions of pollutants from the main emission sources from all processes included in the Sections 1.2 – 1.7 whenever BAT-AELs are given and in process gas-fired power plants in iron and steel works.
BAT is to use continuous measurements at least for:
• primary emissions of dust, NO_X SO_2 from sinter strands dust emissions from blast furnace cast houses
• secondary emissions of dust from basic oxygen furnaces
• emissions of NO_X from power plants dust emissions from large electric arc furnaces.</td><td>FC</td><td>In the initial regulation 60 response Tata only provided details of the current continuous emissions monitoring arrangements as summarised in the Table below but failed to consider whether any of the other emission points would warrant continuous monitoring.

<table>
<tr><th>Description</th><th>BAT</th><th>Dust</th><th>NO_x</th><th>SO_2</th><th>Tata Comment</th></tr>
<tr><td>Sinter plant primary emissions (A1)</td><td>20, 22 & 23</td><td>✓</td><td>✓</td><td>✓</td><td>BAT achieved</td></tr>
<tr><td>Sinter plant secondary emissions (A2)</td><td>26</td><td>✓</td><td></td><td></td><td>BAT achieved</td></tr>
<tr><td>Induration strands of pelletisation plants</td><td>33 & 34</td><td colspan="4">N/A no pelletisation plant at the site</td></tr>
<tr><td>Blast furnace cast houses (A46/A47)</td><td>61</td><td>✓</td><td></td><td></td><td>BAT achieved</td></tr>
<tr><td>BOS plant secondary emissions (A57, A59, A61, A78 and A81)</td><td>78</td><td>✓</td><td></td><td></td><td>BAT achieved</td></tr>
<tr><td>BOS plant secondary emissions (A58)</td><td>78</td><td></td><td></td><td></td><td>Bat not achieved</td></tr>
<tr><td>Power plants</td><td></td><td>✓</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>Electric arc furnaces</td><td colspan="5">N/A No electric arc furnaces at the site</td></tr>
</table>

We asked the operator to review other point source emissions and justify where given their mass flow and emission characteristics continuous emission monitoring would be deemed BAT. The operator responded by referring to their annual pollution inventory returns of Dust, NOx and SO_2 to identify other significant sources, concluding that with the exception of dust emissions from coke oven under firing, which is discussed in BAT 49, all significant sources have been identified and are as listed in the above table.

It should be noted that whilst Continuous Emission Monitors (CEMs) were fitted to the sinter plant stack A1 in 2013 the calibration and verification testing of these monitors remains outstanding but is expected to be completed shortly. We have therefore set an improvement condition IC7 to confirm calibration and verification testing has been undertaken.

Sulphur dioxide emissions are largely controlled by the strict selection of low sulphur input of raw materials. We have specified the limits and controls on the use of raw materials and fuels in Table S2.1 of the consolidated Permit.</td></tr>
</table>

<table>
<tr><th>BAT Conclusion No</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th></tr>
<tr><td></td><td>For other emissions, BAT is to consider using continuous emission monitoring depending on the mass flow and emission characteristics.</td><td></td><td>In the review Tata also identified that emissions of oxides of nitrogen arising from coke oven under firing were significant but as there is no abatement technology fitted have opted to undertake quarterly spot samples.

We asked for more information and justification as to why no proposal to continuously monitor emissions from stack A58 of the BOS plant West secondary vent system. In their response they justify that A58 is only used when East secondary vent (A57) is unavailable, approximately 10% of the time. The West secondary vent system includes a wet scrubber to remove dust and the cleaned waste gas is therefore saturated with moisture and may contain droplets, making conventional forms of continuous monitoring impracticable. We accept that as the system is operated infrequently and given there are practical difficulties with monitoring a wet emissions continuous emissions monitoring at this location is not appropriate.</td></tr>
<tr><td>15</td><td>For relevant emission sources not mentioned in BAT 14, BAT is to measure the emissions of pollutants from all processes included in the Sections 1.2 – 1.7 and from process gas-fired power plants within iron and steel works as well as all relevant process gas components/pollutants periodically and discontinuously. This includes the discontinuous monitoring of process gases, stack emissions, polychlorinated dibenzodioxins/furans (PCDD/F) and monitoring the discharge of waste water, but excludes diffuse emissions</td><td>FC</td><td>Periodic Monitoring of Emissions to Air currently
<table>
<tr><th>Description</th><th>BAT</th><th>Species</th><th>Frequency</th></tr>
<tr><td rowspan="2">Sinter Plant (A1)</td><td>21</td><td>Mercury</td><td>6 months – BAT achieved</td></tr>
<tr><td>25</td><td>Dioxins</td><td>6 months – BAT achieved</td></tr>
<tr><td>Coal grinding</td><td>42</td><td>Dust</td><td>No relevant emission point</td></tr>
<tr><td>Pulverised coal storage</td><td>43</td><td>Dust</td><td>No relevant emission point</td></tr>
<tr><td>Land-based extraction of gases from coke oven charging</td><td>44</td><td>Dust</td><td>Not used at Scunthorpe</td></tr>
<tr><td>Coke oven underfiring (A301, A320 and A303)</td><td>49</td><td>SO2, dust, NOx</td><td>3 months (NOx)
12 months (dust at Appleby)
No dust monitoring at Dawes Lane
No SO_2 monitoring
BAT not achieved</td></tr>
</table></td></tr>
</table>

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement

Land-based extraction of gases from coke oven pushing	50	Dust	Not used at Scunthorpe
Coke grading & Grinding	52	Dust	No relevant emission point
Coal injection storage bunkers (A14)	59	Dust	No monitoring – BAT achieved
Blast furnace stoves (A15 to A20)	65	SO2, dust, NOx	3 months (SO_2 & NOx)12 months (dust) BAT achieved
BOS plant primary emissions– full combustion	76	Dust	Suppressed combustion used
Slag crushing screening	79	Dust	Not operated by Tata Steel

Monitoring of discharges of waste waters - Tata have 10 permitted discharges to controlled waters, identified as W1 to W10. As the table below shows the current sampling does not cover all the parameters for which BAT-AELs are given.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement

Description	BAT	Species	Emission Point	In the current permit yes/no
waste water from the coking process and coke oven gas (COG) cleaning	56	COD	W10	yes
		BOD		yes
		Sulphides		yes
		Thiocyanate		no
		Cyanide		yes
		Polycyclic aromatic hydrocarbons (PAH)		no
		Phenols		yes
		Sum of ammonia-nitrogen (NH 4 + -N), nitrate-nitrogen (NO 3 - -N) and nitrite-nitrogen (NO 2 - -N		yes
waste water from blast furnace gas treatment	67	suspended solids	W1	yes
		iron		no
		lead		yes
		Zinc		yes
		cyanide		yes
waste water discharge from continuous casting	81	suspended solids	W4 & W6	yes
		iron		no
		Zinc		yes
		Nickel		No
		Total Chromium		no
		Total hydrocarbons		Yes but as visible

See also response to BAT 56, 67 and 81. Our approach is discussed in Section 6 Emissions to Water.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
16	BAT is to determine the order of magnitude of diffuse emissions from relevant sources by the methods • Direct measurement. • Indirect measurement • Calculation with emission factors.	FC	The estimation of diffuse dust emissions from the Scunthorpe site is an ongoing area of work being undertaken by Tata Steel as part of a whole site approach to Air Quality Management. Direct emission measurements have been undertaken of fugitive emissions from roof vents on the BOS plant, BF cast house and the Plate Mill, from battery operations at Dawes Lane coke ovens for a small number of ovens, from the sinter cooler. As the air management plan has yet to be approved we have imposed new conditions 3.7 to produce for approval an AQMP that takes a whole site approach and provides greater scope for control. The Air Management Plan will incorporate extensive monitoring, identification of Best Available Techniques and ongoing preventative maintenance, monitoring and actions. Tata will have to follow the approved Plan and review annually.
17	BAT is to prevent pollution upon decommissioning	CC	Tata employ a “site closure environmental toolkit” that encompasses both the site health & safety matters covering the CDM Regulations and environmental issues.
18	BAT is to reduce noise emissions from relevant sources in the iron and steel manufacturing processes	CC	Noise is one of the aspects included in the site-wide EMS. A Noise Management Plan (NMP) has been developed which details potential sources of noise and control measures to be taken and prioritises the sources in terms of their contribution to the overall noise impact of the site. BAT is achieved
BAT Conclusions for Sinter Plant			
19	BAT for blending/mixing is to prevent or reduce diffuse dust emissions by agglomerating fine materials by adjusting the moisture content (see also BAT 11).	CC	A controlled amount of water is added at the mixing drum to achieve the required moisture content of the raw sinter blend, and as such, there will not be an adverse effect on downstream dust emissions. BAT is achieved.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
20	BAT for primary emissions from sinter plants is to reduce dust emissions from the sinter strand waste gas by means of a bag filter or by using advanced electrostatic precipitators when bag filters are not applicable. The BAT- AEL for dust is < 1 – 15 mg/Nm^3 for the bag filter and < 20 – 40 mg/Nm^3 for the advanced ESP both determined as a daily mean	FC	The sinter plants meet current emission limit values through the use of advanced electrostatic precipitators (ESPs) to abate particulate matter, and through the addition of urea to the sinter mix to suppress the formation of dioxins. The BAT-AELs are significantly lower than the current ELVs and Tata Steel will introduce additional techniques to meet these more stringent standards. Research at the sinter plant at their sister site Port Talbot Integrated Steelworks has shown that reducing chloride content of the sinter blend and the injection of lignite into the waste gas to reduces dioxin emissions. Whilst the exact works required at Scunthorpe are yet unknown Tata have committed to completing the necessary improvements to the advanced ESPs and use lignite injection to meet the revised BAT-AELs by 2016. An IC has been set to ensure that this is the case.
21	BAT for primary emissions from sinter strands is to prevent or reduce mercury emissions by selecting raw materials with a low mercury content (see BAT 7) or to treat waste gases in combination with activated carbon or activated lignite coke injection. The **BAT-AEL** for mercury is < 0.03 – 0.05 mg/Nm 3 , as the average over the sampling period (discontinuous measurement	CC	The emission concentrations at Scunthorpe Sinter Plant were in the range 0.0057 to 0.017 mg/Nm^3 in 2011, which is below the BAT-AEL for mercury.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
22	BAT for primary emissions from sinter strands is to reduce sulphur oxide (SO_X) emissions by using one or a combination of techniques: The **BAT- AEL** for sulphur oxides (SO_X) using BAT I – IV is < 350 – 500 mg/Nm^3, expressed as sulphur dioxide (SO_2) and determined as a daily mean value, the lower value being associated with BAT IV.	CC	BAT subsection I is undertaken. The sulphur content of coal charged into the coke ovens is carefully monitored and controlled to ensure a low sulphur content in the coke breeze. The sinter plant fuel rate, including coke breeze consumption, is carefully controlled to limit sulphur loading into the plant and the associated SO_2 emissions. Measured concentrations of SO_2 over the period 2009 to 2011 have been in the range of 265 - 474 mg/Nm^3, with an average of 336 mg/Nm^3. BAT is already achieved.
23	BAT for primary emissions from sinter strands is to reduce total nitrogen oxides (NO_X) emissions by using one or a combination of the following techniques: I. process integrated measures which can include: (i) waste gas recirculation (ii) other primary measures, such as the use of anthracite or the use of low-NO_X burners for ignition II. end-of-pipe techniques which can include (i) the regenerative activated carbon (RAC) process (ii) selective catalytic reduction (SCR).	CC	An MCERTS monitor is to be fitted to emission A1 - Sinter plant which will demonstrate that the Sinter plant is achieving the designed performance and also that the operating techniques are working as predicted. Measured concentrations of NO_2 (2011) have been in the range 253 mg/Nm^3 to 367 mg/Nm3 with an average of 303 mg/Nm^3, thereby meeting the BAT-AEL of 500 mg/Nm^3 .

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	The BAT-AEL for nitrogen oxides (NO_X) using process integrated measures is < 500 mg/Nm^3, expressed as nitrogen dioxide (NO_2) and determined as a daily mean value. The BAT-AEL for nitrogen oxides (NO_X) using RAC is < 250 mg/Nm^3 and using SCR it is < 120 mg/Nm^3, expressed as nitrogen dioxide (NO_2), related to an oxygen content of 15 % and determined as daily mean values.		
24	BAT for primary emissions from sinter strands is to prevent and/or reduce emissions of polychlorinated dibenzodioxins/furans (PCDD/F) and polychlorinated biphenyls (PCB) by using one or a combination of techniques:	CC	Studies have shown that raw materials contain very little PCDD/Fs or PCBs so these inputs are limited to naturally occurring amounts and therefore significant inputs are avoided. Urea addition is used at Scunthorpe sinter plant to suppress the formation of PCDD/Fs. Waste gas recirculation is not utilised at Scunthorpe. We have specified the raw materials and fuels in Table S2.1.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
25	BAT for primary emissions from sinter strands is to reduce emissions of polychlorinated dibenzodioxins/furans (PCDD/F) and polychlorinated biphenyls (PCB) by the injection of adequate adsorption agents into the waste gas duct of the sinter strand before dedusting with a bag filter or advanced electrostatic precipitators when bag filters are not applicable (see BAT 20). The BAT-AEL for polychlorinated dibenzodioxins/furans (PCDD/F) is < 0.05–0.2 ng I-TEQ/Nm^3 for the bag filter and < 0.2–0.4 ng-I-TEQ/Nm^3 for the advanced electrostatic precipitator, both determined for a 6 – 8 hour random sample under steady-state conditions.	FC	Scunthorpe sinter plant is fitted with advanced electrostatic precipitators (ESPs). The average dioxin concentration in 2011 was 1.04 ng I-TEQ/Nm^3. BAT AEL is not currently met. A Sinter Plant IED project has been set up to investigate the use of urea addition, injection of adsorbent (activated lignite) into the waste gas stream, along with controlling the amount of chlorides in the raw sinter blend to reduce emissions of polychlorinated dibenzodioxins/furans (PCDD/F). The results of the studies in 2010 - 2011 showed that the management of chloride content and reverts in the raw sinter blend gave a typical reduction of 50% in PCDD/F emissions, implying that the introduction of appropriate measures would have a significant impact on sinter plant PCDD/F emissions and meet the BAT AEL. A capital expenditure plan (CAPEX) plan is in place to install a lignite injection system by 8th March 2016. An improvement condition has been included in the consolidated permit to report progress in meeting the BAT AEL.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
26	BAT for secondary emissions from sinter strand discharge, sinter crushing, cooling, screening and conveyor transfer points is to prevent dust emissions and/or to achieve an efficient extraction and subsequently to reduce dust emissions by using a combination of I. hooding and/or enclosure II. an electrostatic precipitator or a bag filter. The BAT-AEL for dust is < 10 mg/Nm^3 for the bag filter and < 30 mg/Nm^3 for the electrostatic precipitator, both determined as a daily mean value.	FC	Electrostatic precipitators are installed. Monitoring results for 2011 showed emissions (from the dedust stack, A2) to be in the range 15-113 mg/Nm^3 with an average of 33.4 mg/Nm^3. As discussed above studies are being undertaken as part of the sinter plant IED project to benchmark the ESP in order to seek performance improvements through measures such as refurbishment of engineering and electrical systems. Tata are confident that BAT will be met by March 2016. In order to ensure that this is the case an improvement condition (IC1) has been included in the consolidated permit to report progress in meeting the BAT AEL.
27	BAT is to minimise water consumption in sinter plants by recycling cooling water as much as possible unless once-through cooling systems are used.	CC	A semi-closed loop recirculation system is used for cooling the ignition hood. BAT is achieved.
28	BAT is to treat the effluent water from sinter plants where rinsing water is used or where a wet waste gas treatment system is applied, with the exception of cooling water prior to discharge	NA	Rinse water is not used; dry gas cleaning is achieved using dry electrostatic precipitators. The only waste waters from the sinter plant arise from blow down from cooling systems.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
29	BAT is to prevent waste generation within sinter plants (see BAT 8): BAT is to manage in a controlled manner sinter plant process residues which can neither be avoided nor recycled.	CC	The sinter plant ESP dusts from the first two fields are recycled back into the sintering process. Dust from the last ESP field is rich in heavy metals, alkali and chloride and is not recycled to the sinter plant; it is instead formed into waste oxide briquettes (WOBs) and recycled through the BOS plant.
30	BAT is to recycle residues that may contain oil, such as dust, sludge & mill scale which contain iron & carbon from the sinter strand and other processes in the integrated steelworks	CC	Recycling of these materials is maximised this is discussed in BAT 8 and subject to the restrictions described in BAT 31.
31	BAT is to lower the hydrocarbon content of the sinter feed by appropriate selection and pre treatment of the recycled process residues. In all cases, the oil content of the recycled process residues should be < 0.5 % and the content of the sinter feed < 0.1 %.	CC	There are strict controls over materials to be introduced to the sintering process oil content is limited to less than 0.5% in any input materials. The contribution of oily millscale to total sinter feed is controlled to ensure oil content in the total feed is less than 0.1%.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
32	BAT is to reduce thermal energy consumption within sinter plants by using one or a combination of techniques: I. recovering sensible heat from the sinter cooler waste gas II. recovering sensible heat, if feasible, from the sintering grate waste gas III. maximising the recirculation of waste gases to use sensible heat (see BAT 23 for description and applicability).	CC	As outlined in the initial regulation 60 response Tata state that BAT I is achieved as much as economically feasible. BAT II not feasible BAT III not applicable Overall – BAT achieved. They maintain that the existing configuration makes the costs of heat recovery from the sinter waste gases or sinter cooler waste gas very high. Furthermore as waste gas temperatures must be maintained above the dew point to avoid unacceptable corrosion problems, any lowering the waste gas temperature would lead to less effective dispersion of the sinter plant plume. We accept that the existing configuration limits achieving further reduction of thermal energy consumption within the sinter plants.
BAT Conclusions for Pelletisation Plants			
BAT Conclusions 33 to 41 inclusive	There are no Pelletisation plants in the UK	NA	BATC 33 to 41 are not relevant

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
BAT Conclusion for Coke Oven Plants			
42	BAT for coal grinding plants (coal preparation including crushing, grinding, pulverising and screening) is to prevent or reduce dust emissions by using one or a combination of the following techniques: I. building and/or device enclosure (crusher, pulveriser, sieves) and II. efficient extraction and use of a subsequent dry dedusting systems. The BAT-AEL for dust is < 10 – 20 mg/Nm3, as the average over the sampling period (discontinuous measurement, spot samples for at least half an hour).	CC/NA	Two coal crushers are operated at Scunthorpe's coal handling plant, both of which are fully enclosed in a building. No extraction system is employed BAT I achieved BAT II is not used and the corresponding BAT-AEL is not applicable

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
43	BAT for storage and handling of pulverised coal is to prevent or reduce diffuse dust emissions by using one or a combination of the following techniques: I. storing pulverised materials in bunkers and warehouses II. using closed or enclosed conveyors III. minimising the drop heights depending on the plant size and construction IV. reducing emissions from charging of the coal tower and the charging car V. using efficient extraction and subsequent dedusting When using BAT V, the BAT-AEL for dust is < 10 – 20 mg/Nm^3, as the average over the sampling period (discontinuous measurement, spot samples for at least half an hour).	CC	BAT I to IV are applied such that dust is adequately controlled without the need for additional extraction and dedusting. As there is no extraction BAT V and the corresponding BAT – AEL is not applicable. BAT is achieved

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
44	BAT is to charge coke oven chambers with emission-reduced charging systems. The BAT-AEL for dust from coal charging systems with land-based treatment of extracted gases is < 5 g/t coke equivalent to < 50 mg/Nm^3, as the average over the sampling period (discontinuous measurement, spot samples for at least half an hour). The duration associated with BAT of visible emissions from charging is < 30 seconds per charge as a monthly average using a monitoring method described in BAT 46.	CC	Scunthorpe has two set of cokes ovens – Appleby Coke Ovens (ACO) and Dawes Lane (DLCO). Both plants use smokeless charging through connecting the charging cars to the oven chambers with gas-tight telescopes and using high-pressure steam aspiration to draw the displaced air and any evolved gases into the coke oven gas collector main to ensure that the gases and dust are treated as part of the coke oven gas treatment (by-products) plant. One charging car is in use at Dawes Lane coke ovens, and two are used at Appleby; at both plants there is a further charging car on standby to ensure continuous availability. Tata have stated that as the gases and dust are treated as part of the coke oven gas treatment, not in a separate land-based treatment plant, the BAT AEL is not applicable. We agree with this statement. Visible emissions from charging are assessed using a BCRA methodology with the reporting as a weekly Mass Emission Factor (MEF), a MEF of 0.5 corresponds to a visible emission from charging of less than 30 second. In 2013 the weekly MEFs at Dawes Lane have ranged from 0.05 - 0.45 with a monthly average of well below 0.5 and hence in compliance. At Appleby, measured weekly MEFs have ranged from 0.09 to 0.61 over the last twelve months but the maximum monthly average below 0.5. **We agree that BAT is already achieved.**
45	BAT for coking is to extract the coke oven gas (COG) during coking as much as possible.	CC	Coke oven gas is a valuable by-product of the coking process and is extracted as much as possible for subsequent use as a fuel across the integrated works. In the event of there being insufficient storage capacity available in the COG gas holder, excess COG may be flared, but the measures already employed to optimise utilisation of process gases, along with the future application of a state-of-the-art predictive control system (ISOLDE) will minimise losses through flaring (see BAT 3). In 2012, less than 2½% of the total coke oven gas production was flared. BAT is achieved.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
46	BAT for coke plants is to reduce the emissions through achieving continuous undisrupted coke production by using the following techniques: I. extensive maintenance of oven chambers, oven doors and frame seals, ascension pipes, charging holes and other equipment (a systematic programme should be carried out by specially-trained detection and maintenance personnel) II. avoiding strong temperature fluctuations III. comprehensive observation and monitoring of the coke oven IV. cleaning of doors, frame seals, charging holes, lids and ascension pipes after handling (applicable at new and, in some cases, existing plants) V. maintaining a free gas-flow in the coke ovens	FC	BAT I—IX are applied. BAT X and XI are not applicable as they apply to new plants. Visible emissions from doors, ascension pipes (BAT VII) and charge holes (BAT VIII) are assessed using a BCRA methodology as referenced above and are reported as a Door Leakage Control Factor (DLCF) and Top Leakage Control Factor (TLCF – includes both ascension pipes and charge holes). The BCRA methodology distinguishes different severities of leakage, ranging from minor (Grade 1) to extremely severe (Grade 4), whereas the BAT-associated standard makes no such distinction. All the UK coke oven operators are working together to develop a system that allows comparison with the BAT-associated standard. We have set an IC with associated timelines to demonstrate compliance

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	VI. adequate pressure regulation during coking and application of spring-loaded flexible sealing doors or knife-edged doors (in cases of ovens ≤ 5 m high and in good working order) VII. using water-sealed ascension pipes to reduce visible emissions from the whole apparatus which provides a passage from the coke oven battery to the collecting main, gooseneck and stationary jumper pipes VIII. luting charging hole lids with a clay suspension (or other suitable sealing material), to reduce visible emissions from all holes IX. ensuring complete coking (avoiding green coke pushes) by application of adequate techniques X. installing larger coke oven chambers (applicable to new plants or in some cases of a complete replacement of the plant on the old foundations)		

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	XI. where possible, using variable pressure regulation to oven chambers during coking (applicable to new plants and can be an option for existing plants; the possibility of installing this technique in existing plants should be assessed carefully and is subject to the individual situation of every plant).The percentage of visible emissions from all doors associated with BAT is < 5 – 10 %. The percentage of visible emissions for all source types associated with BAT VII and BAT VIII is < 1 %. The percentages are related to the frequency of any leaks compared to the total number of doors, ascension pipes or charging hole lids as a monthly average using a monitoring method as described below.		

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	For the estimation of diffuse emissions from coke ovens the following methods are in use: • the EPA 303 method • the DMT (Deutsche Montan Technologie GmbH) methodology the methodology developed by BCRA		
47	BAT for the gas treatment plant is to minimise fugitive gaseous emissions by using the following techniques: I-IV I. minimising the number of flanges by welding piping connections wherever possible II. using appropriate sealings for flanges and valves III. sing gas-tight pumps (e.g. magnetic pumps) IV. avoiding emissions from pressure valves in storage tanks	CC&FC	With the exception of BAT IV, BAT is already met. A number of storage tank pressure valves at DLCO are vented to the down comer to avoid emissions to air, other tanks at both coke plants do vent to atmosphere. An annual estimated assessment of the mass of VOCs released from pressure relief valves in 2012 found emissions were 98 kg benzene and 147 kg other VOCs from storage tanks at Dawes Lane coke ovens (emission point A313) and 672 kg benzene and 851 kg other VOCs from Appleby's storage tanks (emission point A322). A program is in place to eliminate the use of storage tank pressure relief valves that vent directly to atmosphere, as tanks are replaced in the future, vents to atmosphere will be eliminated and BAT IV achieved.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
48	BAT is to reduce the sulphur content of the coke oven gas (COG) by using one of the following techniques: I. desulphurisation by absorption systems II. wet oxidative desulphurisation. The residual hydrogen sulphide (H_2S) concentrations associated with BAT, determined as daily mean averages, are < 300 – 1 000 mg/Nm 3 in the case of using BAT I (the higher values being associated with higher ambient temperature and the lower values being associated with lower ambient temperature) and < 10 mg/Nm 3 in the case of using BAT II.	NC	See Section 6 – Assessment, determination and decision where an application(s) for Derogation from BAT Conclusions with associated emission levels (AEL) has been requested

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
49	BAT for the coke oven under firing is to reduce the emissions by using the following techniques: I. preventing leakage between the oven chamber and the heating chamber by means of regular coke oven operation II. repairing leakage between the oven chamber and the heating chamber (only applicable to existing plants). III. incorporating low-nitrogen oxides (NO_X) techniques in the construction of new batteries, such as staged combustion and the use of thinner bricks and refractory with a better thermal conductivity (only applicable to new plants) IV. using desulphurised coke oven gas (COG) process gases	NC	Dust is not currently measured at Dawes Lane, but equipment to provide measurements will be installed by 2016. We are requiring the installation of a MCERTS approved, Obscuration Continuous Emission Monitor (CEM) on A301, Dawes Lane Coke Oven Stack and commissioning to improve control of particulate emissions from the battery heating systems and structures. This is now the only UK coke oven under firing stack emission point without such CEMs and previously has used a Carbon Monoxide CEM as a surrogate measure. BAT I & II Due to the age of the batteries, the condition of the walls separating the heating chambers from the ovens themselves has deteriorated and performance falls short of that expected from new plants. This has been exacerbated by the enforced sub-optimal operating conditions during the recent economic crisis, when coking times were increased to match coke output to demand for steel. Repairing of leakages is a priority and the maintenance regime has been stepped up. Bat III - Batteries 2, 3 and 4 at Appleby coke ovens (all of which were rebuilt during the 1990s) incorporate staged combustion to reduce NOx formation. Battery 1 at Appleby and all the batteries at Dawes Lane are older and do not incorporate low-NOx techniques. We accept that it is not possible to retro-fit integrated low-NOx techniques to existing coke plants without a full rebuild of the batteries. Consequently when the coke ovens are rebuilt we would expect integrated low-NOx techniques to be fitted. We have included an improvement condition IC6 IV. using desulphurised coke oven gas (COG) process gases - Coke oven gas is not currently desulphurised at either of the Scunthorpe coke plants.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	The BAT-associated emission levels, determined as daily mean values and relating to an oxygen content of 5 % are — sulphur oxides (SO_X), expressed as sulphur dioxide (SO_2) < 200 – 500 mg/Nm^3 — dust < 1 – 20 mg/Nm^3 — nitrogen oxides (NO_X), expressed as nitrogen dioxide (NO_2) < 350 – 500 mg/Nm^3 for new or substantially revamped plants (less than 10 years old) and 500 – 650 mg/Nm^3 for older plants with well maintained batteries and incorporated low-nitrogen oxides (NO_X) techniques.		**See Section 6 - Assessment, determination and decision where an application(s) for Derogation from BAT Conclusions with associated emission levels (AEL) has been requested**

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
50	BAT for coke pushing is to reduce dust emissions by using the following techniques: I. extraction by means of an integrated coke transfer machine equipped with a hood II. using land-based extraction gas treatment with a bag filter or other abatement systems III. using a one point or a mobile quenching car. The BAT-associated emission level for dust from coke pushing is < 10 mg/Nm^3 in the case of bag filters and of < 20 mg/Nm^3 in other cases, determined as the average over the sampling period (discontinuous measurement, spot samples for at least half an hour).	NC	Integrated coke transfer machines equipped with hood are employed at both coke works but he BAT AEL is not achieved. **See Section 6 - Assessment, determination and decision where an application(s) for Derogation from BAT Conclusions with associated emission levels (AEL) has been requested**

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
51	BAT for coke quenching is to reduce dust emissions by using one of the following techniques: I. using coke dry quenching (CDQ) with the recovery of sensible heat and the removal of dust from charging, handling and screening operations by means of a bag filter II. using emission-minimised conventional wet quenching III. using coke stabilisation quenching (CSQ). The BAT-AELs for dust, determined as the average over the sampling period, are: — < 20 mg/Nm^3 in case of coke dry quenching — < 25 g/t coke in case of emission minimised conventional wet quenching — < 10 g/t coke in case of coke stabilisation quenching	NC	Dust emissions from coke quenching are reduced using BAT II conventional wet quenching. BAT III is not achieved. **See Section 6 - Assessment, determination and decision where an application(s) for Derogation from BAT Conclusions with associated emission levels (AEL) has been requested.**
52	BAT for coke grading and handling is to prevent or reduce dust emissions	NA	Coke grading is undertaken by a contractor (Harsco) under a separate Permit. BAT is not applicable for this permit.
53	BAT is to minimise and reuse quenching water as much as possible.	CC	All quenching water, whether collected from the quench tower itself or from subsequent draining of the coke car or from drainage from the coke wharf, is returned to settling ponds where coke particles are removed and the water is then reused for further coke quenches. There is no blow down from the quench water system, though water will be lost by evaporation on contact with the hot coke. BAT is achieved

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
54	BAT is to avoid the reuse of process water with a significant organic load (like raw coke oven waste water, waste water with a high content of hydrocarbons, etc.) as quenching water.	CC	Most of the process water used for quenching is recycled and make-up of the system is provided either by river water or by drainage from areas such as the coal handling plant which does not have a high content of hydrocarbons. Raw coke oven waste water is not used for quenching. BAT is achieved
55	BAT is to pre treat waste water from the coking process and coke oven gas (COG) cleaning prior to discharge to a waste water treatment plant	CC	Tar and contaminated waste waters are removed from the coke oven gas in the downcomer, electrostatic detarrers and at other points within the by-products plants. All these streams are fed to the tar/liquor separators, where the tar is removed by sedimentation and the tar-free liquors are either recycled to the process as flushing liquor or are further treated before discharge to the coke oven effluent treatment plant. The majority of the PAH loading in the waste waters is associated with the tar content, and so this process also removes PAHs. Ammonia is stripped from the strong liquor using live steam in the free and fixed ammonia stills, with caustic soda added to react with any fixed ammonia species (such as ammonium sulphate) to form easily-removed ammonium hydroxide. BAT is achieved

<table>
<tr><th>BAT Conclusion No</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th></tr>
<tr><td>56</td><td>BAT for pre-treated waste water from the coking process and coke oven gas (COG) cleaning is to use biological waste water treatment with integrated denitrification/nitrification stages. The BAT-AELs, based on a qualified random sample or a 24-hour composite sample and referring only to single coke oven water treatment plants, are:
chemical oxygen demand (COD [(1)]) < 220 mg/l
biological oxygen demand for 5 days (BOD_5) < 20 mg/l
sulphides, easily released [(2)] < 0.1 mg/l
thiocyanate (SCN^-) < 4 mg/l
cyanide (CN^-), easily released [(3)] < 0.1 mg/l
polycyclic aromatic hydrocarbons (PAH) (sum of Fluoranthene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene &Benzo[g,h,i]perylene) < 0.05 mg/l
phenols < 0.5 mg/l
sum of ammonia-nitrogen (NH_4^+-N), nitrate-nitrogen (NO_3 - -N) and nitrite-nitrogen (NO_2 - -N) < 15 – 50 mg/l.</td><td>NC</td><td>The combined waste waters from both coke plants at Scunthorpe are treated in a single biological effluent treatment plant. This plant does not currently incorporate integrated denitrification/nitrification stages and hence the BAT-AEL for nitrogenous species is not achieved. As the table below shows the BAT AEL's for NH_3 is not achieved

<table>
<tr><th>Parameter</th><th>BAT-AEL Range In mg/l</th><th>Monitoring results in mg/l</th><th>BAT achieved Y/N</th></tr>
<tr><td>Chemical oxygen demand</td><td><220</td><td>101-170</td><td>Y</td></tr>
<tr><td>Biological oxygen demand</td><td><20</td><td>1 to 13</td><td>Y</td></tr>
<tr><td>Sulphides</td><td><0.1</td><td>Not measured</td><td></td></tr>
<tr><td>Thiocyanate</td><td><4</td><td>0.01 to 3.3</td><td>Y</td></tr>
<tr><td>Cyanide</td><td><0.1</td><td>0.02 to 1.2</td><td>N</td></tr>
<tr><td>Polycyclic aromatic hydrocarbons</td><td><0.05</td><td>0.008 to 0.039</td><td>Y</td></tr>
<tr><td>Phenols</td><td><0.5</td><td>0.01 to 1.1</td><td>N</td></tr>
<tr><td>Sum of ammonia, nitrate & nitrite as N</td><td><15–50</td><td>75-128</td><td>N</td></tr>
</table>

It should be noted that in the case of cyanide, only two measurements over a period of four years exceeded 0.14 mg/l, but 12.5% of measurements exceeded the BAT-AEL of 0.1 mg/l.

For phenols, only two measurements over a period of four years exceeded the BAT-AEL; the remaining readings (over 98% of the total) were all below 0.07 mg/l and thus well within the required standard.

See Section 6 Assessment, determination and decision where an application(s) for Derogation from BAT Conclusions with associated emission levels (AEL) has been requested.

And Section 7 Emissions to Water</td></tr>
</table>

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
57	BAT is to recycle production residues such as tar from the coal water and still effluent, and surplus activated sludge from the waste water treatment plant back to the coal feed of the coke oven plant.	CC	Tar residues from the two by-products plants are recycled to the coal handling plant and mixed with coal to add back to the blend. Surplus activated sludge from the biological effluent treatment plant is also recycled by adding it to the coal blend. BAT is achieved
58	BAT is to use the extracted coke oven gas (COG) as a fuel or reducing agent or for the production of chemicals.	CC	Coke oven gas is a valuable process gas and is used as a fuel across the integrated works BAT is achieved
BAT Conclusions for Blast Furnaces			
59	BAT for displaced air during loading from the storage bunkers of the coal injection unit is to capture dust emissions and perform subsequent dry dedusting. The **BAT-AEL** for dust is < 20 mg/Nm^3, determined as the average over the sampling period (discontinuous measurement, spot samples for at least half an hour).	FC	There are two coal storage silos for each blast furnace, each with 200t capacity. The top of each silo is equipped with a bag filter. Nitrogen is used to blow coal into the silos (air can be used as a back-up) and the filters screen the displaced nitrogen. The bags are changed regularly, this task being a scheduled activity within the local maintenance planning system. The filters are equipped with pulse-jet cleaning to de-dust the bags and maintain high levels of performance. This prevents the bags from becoming blocked with dust and then over-pressurising the filter. Collected dust is returned to the silo. Although the techniques referred to above are used, no measurements are undertaken and so compliance with the BAT-AEL cannot be quantitatively demonstrated. We are requiring continuous monitors (“policing CEMS”) to be installed by 2016 to alert the operators to any adverse emissions from these filters so that faults can be rectified. This will provide better protection of the environment than relying on infrequent discontinuous measurement.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
60	BAT for burden preparation (mixing, blending) and conveying is to minimise dust emissions and, where relevant, extraction with subsequent dedusting by means of an electrostatic precipitator or bag filter.	FC	Fugitive Emissions Reduction Programme is in operation as discussed in BAT 11. Priorities include reviewing dust control measures on the coke screens and for subsequent stocking of coke breeze.
61	BAT for casting house (tap holes, runners, torpedo ladles charging points, skimmers) is to prevent or reduce diffuse dust emissions by using the following techniques: I. covering the runners II. optimising the capture efficiency for diffuse dust emissions and fumes with subsequent off-gas cleaning by means of an electrostatic precipitator or bag filter III. fume suppression using nitrogen while tapping, where applicable and where no collecting and de-dusting system for tapping emissions is installed. When using BAT II, the BAT-AEL for dust is < 1 – 15 mg/Nm^3, determined as a daily mean value.	CC	Runners are covered. Cast houses on all operating furnaces have extraction systems with gas cleaning by means of bag filters. Scunthorpe blast furnaces share a common extraction system and two bag filters. Nitrogen suppression is not deemed applicable as tapping emissions are extracted directly from above the tap hole and collection efficiency is generally good. Monitoring results from the bag filter exhausts A46 and A47 over the last 10 years have all been less than 10mg/m^3 Bat is achieved.
62	BAT is to use tar-free runner linings.	FC	Tar free linings are used where cost effective. The use of 100% tar-free linings will be achieved by 2016. We have set an improvement condition IC1 to ensure the improvements are made by 8th March 2016.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
63	BAT is to minimise the release of blast furnace gas during charging by using one or a combination of the following techniques: I. bell-less top with primary and secondary equalising II. gas or ventilation recovery system III. use of blast furnace gas to pressurise the top bunkers.	CC	A bell-less top is used at Queen Bess, Queen Anne and Queen Victoria. Each also uses semi-clean blast furnace gas (BFG) to pressurise the top bunkers.
64	BAT is to reduce dust emissions from the blast furnace gas by using one or a combination of techniques: (For cleaned blast furnace (BF) gas, the residual dust concentration associated with BAT is < 10 mg/Nm3, determined as the average over the sampling period (discontinuous measurement, spot samples for at least half an hour).	CC	All furnaces are equipped with dust catchers to dry dedust the blast furnace gas prior to further dust removal. The recovered flue-dust is returned for use in the sinter plant. Subsequent dust abatement of blast furnace gas is undertaken using a wet scrubbing system. Solids are removed from the gas cleaning waters in clarifiers and the resultant material is recovered, with the supernatant material being re-circulated (see BAT 8 response for more information). The measurement of dust concentrations in cleaned BF gas is difficult to achieve due to safety concerns when measuring in a positively pressurised gas stream containing approximately 22% carbon monoxide. Measurements were under taken by experienced personnel wearing breathing apparatus on commissioning of the relined Queen Anne BF in 2014 which confirmed that the BAT AEL was achieved.

<table>
<tr><th>BAT Conclusion No</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th></tr>
<tr><td>65</td><td>BAT for hot blast stoves is to reduce emissions by using desulphurised and dedusted surplus coke oven gas, dedusted blast furnace gas, dedusted basic oxygen furnace gas and natural gas, individually or in combination. The BAT-AEL, determined as daily mean values related to an oxygen content of 3 %, are:
SO_2 < 200 mg/Nm^3
dust < 10 mg/Nm^3
NO_2 < 100 mg/Nm^3</td><td>CC</td><td>All stoves are fired exclusively on dedusted blast furnace gas. Analysis of the periodic monitoring peak results since 2005 to 2013 show that BAT AELs are being met

<table><tr><td>Parameter</td><td>ELV in mg/m^3</td><td>BAT AEL in mg/m^3</td></tr><tr><td>NO_2</td><td>8</td><td>100</td></tr><tr><td>SO_2</td><td>106</td><td>200</td></tr><tr><td>dusts (particulates).</td><td>8.44</td><td>10</td></tr></table>
BAT requires that continuous monitoring is undertaken. We have included an improvement condition to ensure this is achieved.</td></tr>
<tr><td>66</td><td>BAT for water consumption and discharge from blast furnace gas treatment is to minimise and to reuse scrubbing water as much as possible</td><td>CC</td><td>Scrubbing water is processed in clarifiers (for Queen Anne and Queen Victoria, which are on a common scrubber water system, there are 3 clarifiers). Supernatant water from these is re-circulated into the scrubbing system and is additionally used in slag granulation; evaporative losses from the system will be topped up with fresh-water.</td></tr>
<tr><td>67</td><td>BAT for treating waste water from blast furnace gas treatment is to use flocculation (coagulation) and sedimentation and the reduction of easily released cyanide, if necessary.
The BAT-AEL based on a qualified random sample or a 24-hour composite sample, are:
- suspended solids < 30 mg/l
- iron < 5 mg/l
- lead < 0.5 mg/l
- zinc < 2 mg/l
- cyanide (CN -), easily released < 0.4 mg/l.</td><td>FC</td><td>Blast furnace gas cleaning water is discharged to clarifiers where the solids settle out. The clarified water is pumped to a cooling tower for recycling via the reservoir and the sludge from the clarifiers is treated in a bank of hydrocyclones. The hydrocyclone overflow is pumped to the BF/BOS slurry lagoons where further settlement is allowed. The hydrocyclone underflow is recycled via the sinter plant. This process is capable of achieving the BAT-AELs for suspended solids, iron, zinc and lead. Cyanide is not measured in the hydrocyclone overflow, though measurements at the final discharge point (W1) demonstrate that the BAT-AEL is achieved at that point.

We have now set a new limit and monitoring of Cyanide in line with BAT67 (See Table S3.8).</td></tr>
</table>

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
68	BAT is to prevent waste generation from blast furnaces by using one or a combination of techniques: I appropriate collection and storage to facilitate a specific treatment II on-site recycling of coarse dust from the blast furnace (BF) gas treatment and dust from the cast house dedusting, with due regard for the effect of emissions from the plant where it is recycled III. hydrocyclonage of sludge with subsequent on-site recycling of the coarse fraction(applicable whenever wet dedusting is applied and where the zinc content distribution in the different grain sizes allows a reasonable separation) IV. slag treatment, preferably by means of granulation (where market conditions allow for it), for the external use of slag (e.g. in the cement industry or for road construction). BAT is to manage in a controlled manner blast furnace process residues which can neither be avoided nor recycled.	CC	All waste generated by the blast furnace operation are recycled. Waste generation from the blast furnaces is prevented by applying BATs I & III. Hydrocyclones are used for processing of all blast furnace sludge at Scunthorpe. Two separate fractions from the sludge hydrocyclone are either returned for use in the sinter plant or in the case of the finer overflow material this goes to a filter press with removal of the solids as a filter cake that is then sold to the cement industry as iron oxide. II Residual material from the cast house extraction unit filter dust is returned as a raw material to the sinter plant. IV Slag granulation is used. Any slag that is not granulated is air-cooled is sent to an on-site third party for grinding into a cement and air-cooled slag is subject to metal recovery and other processing for use as an aggregate. On occasions material is temporarily stockpiled for recovery because of imbalances between the rates of generation and consumption. It has high moisture content ensuring no diffuse dust emissions arise. Bat is achieved.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
69	BAT for minimising slag treatment emissions is to condense fume if odour reduction is required.	CC	In the initial regulation 60 response Tata stated that odour reduction was not required and fully condensing granulation was not deemed to be relevant. We asked Tata to justify this statement. They responded that as odour complaints are rare, with only two justified complaints associated with odour from the Blast Furnaces have been made; one in February 2006 attributable to slag treatment, one in April 2007 was caused by a blast furnace bleeder release, odour reduction is not required. We accept that a condensing fume granulator is not required.
70	BAT for resource management of blast furnaces is to reduce coke consumption	CC	All blast furnaces at Scunthorpe are equipped with granular coal injection and oxygen enrichment. BAT is achieved
71	BAT is to maintain a smooth, continuous operation of the blast furnace at a steady state to minimise releases and to reduce the likelihood of burden slips.	CC	Furnace operation is monitored constantly using electronic instrumentation. A display is provided on a VDU in the manned control room. Burden descent is closely monitored to prevent slippage. BAT is achieved
72	BAT is to use the extracted blast furnace gas as a fuel	CC	Blast furnace gas is used wherever possible, primarily in the blast furnace stoves, the Turbo Blower House and the Central Power Station. Flaring is monitored constantly and efforts are taken to minimise this; the future application of a state-of-the-art predictive control system (ISOLDE) will further minimise losses through flaring (see BAT 3). BAT is achieved
73	BAT is to recover the energy of top blast furnace gas pressure where sufficient top gas pressure and low alkali concentrations are present.	NA	Noted that the BAT conclusion is only applicable where an adequate top gas pressure in excess of 1.5 bar gauge. The working top gas pressure for Scunthorpe blast furnaces is insufficient (the three operational furnaces all have a working top gas pressure of 0.8 bar). We accept that top gas energy recovery is not applicable.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
74	BAT is to preheat the hot blast stove fuel gases or combustion air using the waste gas of the hot blast stove and to optimise the hot blast stove combustion process.	CC	Each furnace has four hot blast stoves operated in a computer-controlled, staggered parallel, automatic system. This enables maximum hot blast temperature to be achieved continuously without the need to bleed cold blast into the flow, maximising efficiency. Preheating of the fuel or combustion air is not feasible as the waste gas temperature after passing through the stove chequer work is typically below 250°C (though it varies through the heating cycle), making further heat recovery uneconomic. Stoves are equipped with individual waste gas analysers to ensure that maximum combustion efficiency is maintained. BAT is achieved

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
BAT Conclusions for Basic Oxygen Steelmaking and Casting			
75	BAT for basic oxygen furnace (BOF) gas recovery by suppressed combustion is to extract the BOF gas during blowing as much as possible and to clean it by using a combination of techniques. I. use of a suppressed combustion process II. prededusting to remove coarse dust by means of dry separation techniques (e.g. deflector, cyclone) or wet separators III. dust abatement by means of: (i) dry dedusting (e.g. electrostatic precipitator) for new and existing plants (ii) wet dedusting (e.g. wet electrostatic precipitator or scrubber) for existing plants. The residual dust concentrations associated with BAT, after buffering the BOF gas, are: — 10 – 30 mg/Nm^3 for BAT III. (i) and (ii). < 50 mg/Nm^3 for BAT III	CC	In the additional information response dated 19/3/15 it was confirmed that BAT techniques (I-III) were being applied but the measurement of dust concentrations in cleaned BOS gas was not being undertaken due to safety concerns when measuring in a positively pressurised gas stream containing approximately 69% carbon monoxide. As in the case of blast furnace gas (see BAT 64). Tata have proposed the use of dust emissions from combustion processes as a surrogate for measuring dust concentrations in the BOS gas itself. The BOS gas is never combusted in isolation, but rather as a component of mixed enhanced gas (MEG, with a controlled calorific value and Wobbe index), which is piped around the site and burned in various processes, particularly in the reheating furnaces of the three rolling mills. The composition of MEG is variable, but a typical mixture at the Anchor mixing station is 10 parts BOS gas to 1 part coke oven gas. Such a mixture, combusted with sufficient excess air to leave a waste gas oxygen content of 3% on a dry basis, requires 2.33 m³ air per m³ of MEG and gives 2.87 m³ dry waste gas. If the residual dust concentration in the buffered BOS gas was at the BAT associated standard of 50 mg/Nm³, this would give 50x0.909/2.87 = 16 mg/Nm³ dust in the dry waste gas (at reference conditions of 3% oxygen). Dust in the COG, soot from incomplete combustion or scale drawn into the waste gas system could also contribute to dust emissions, so 16 mg/Nm³ represents the lower bound of dust concentrations in the waste gas from MEG combustion that is equivalent to the BAT associated standard. We accept that the direct measurement of dust emissions is not practicable. The monitoring requirements for emission points A54, A55 and A56 of particulate matter have been removed on health and safety grounds due to the nature of the gas stream being more than 69% Carbon Monoxide. See Table S3.4 We have set at an equivalent measure the surrogate measurement of particulate emissions in the waste gas stack of one of the reheat furnaces on site where a result less than 16 mg/Nm³ will be deemed compliant with BAT75

<table>
<tr><th>BAT Conclusion No</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th></tr>
<tr><td>76</td><td>BAT for basic oxygen furnace (BOF) gas recovery during oxygen blowing in the case of full combustion is to reduce dust emissions</td><td>NA</td><td>BAT is not applicable as suppressed combustion is used – see response to BAT 75.</td></tr>
<tr><td>77</td><td>BAT is to minimise dust emissions from the oxygen lance hole</td><td>CC</td><td>The lance hole is covered during oxygen blowing and a nitrogen purge system is used to ensure the seal. BAT is achieved</td></tr>
<tr><td>78</td><td>BAT for secondary dedusting, including the emissions from the following processes:
- reladling of hot metal from the torpedo ladle (or hot metal mixer) to the charging ladle
- hot metal pre-treatment (i.e. the preheating of vessels, desulphurisation, dephosphorisation, deslagging, hot metal transfer processes and weighing)
- BOF-related processes like the preheating of vessels, slopping during oxygen blowing, hot metal and scrap charging, tapping of liquid steel and slag from BOF and
- secondary metallurgy and continuous casting, is to minimise dust emissions by means of process integrated techniques, such as general techniques to prevent or</td><td>CC</td><td>As detailed in the initial response to the regulation 60 notice the techniques described for secondary are already undertaken. The overall dust collection efficiency is 98.8%, which exceeds the BAT-associated standard of 90%

The table below summarises the current the performance level of each system against the revised BAT AEL’s.
<table>
<tr><th>Stack Ref</th><th>Process Served</th><th>Abatement Technique</th><th>BAT-AEL (mg/Nm³, daily mean)</th><th>Current ELV (mg/Nm³, spot sample)</th><th>Measured emission (mg/Nm³, average of spot samples, 2010-2012)</th><th>Average monitoring result (mg/Nm³, cems2013 to date)</th><th>BAT met</th></tr>
<tr><td>A57</td><td>East secondary vent</td><td>Electrostatic precipitator</td><td>20</td><td>20</td><td>7.52</td><td>6.06</td><td>Y</td></tr>
<tr><td>A58</td><td>West secondary vent</td><td>Venturi wet scrubber</td><td>-</td><td>20</td><td>25.4</td><td>No CEM</td><td>NA</td></tr>
<tr><td>A61</td><td>Hot metal pour/ desulphurisation</td><td>Bag filter</td><td>15</td><td>20</td><td>2.08</td><td>1.9</td><td>Y</td></tr>
<tr><td>A78</td><td>Steel/slag ladle decant</td><td>Bag filter</td><td>10</td><td>5</td><td>2.88</td><td>0.01</td><td>Y</td></tr>
<tr><td>A59</td><td>Lade Arc Furnaces 1&2</td><td>Bag filter</td><td>10</td><td>25</td><td>6.83</td><td>3.71</td><td>Y</td></tr>
<tr><td>A81</td><td>Lade Arc Furnace 3</td><td>Bag filter</td><td>10</td><td>25</td><td>4.11</td><td>0.1</td><td>Y</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>BAT Conclusion No</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th></tr>
<tr><td></td><td>control diffuse or fugitive emissions, and by using appropriate enclosures and hoods with efficient extraction and a subsequent off-gas cleaning by means of a bag filter or an ESP.
The overall average dust collection efficiency associated with BAT is > 90 %
The BAT-AEL for dust, as a daily mean value, for all dedusted off-gases is < 1 – 15 mg/Nm3 in the case of bag filters and < 20 mg/Nm3 in the case of electrostatic precipitators.
If the emissions from hot metal pre-treatment and the secondary metallurgy are treated separately, the BAT-AEL for dust, as a daily mean value, is < 1 – 10 mg/Nm^3 for bag filters and < 20 mg/Nm^3 for electrostatic precipitators.</td><td></td><td>With the exception of emission point A58 the BAT AEL is already achieved. In respect of A58 the operator has added that spot samples taken over the last 8 years confirm 50 mg/m³ is readily achievable as four measurements have resulted in emissions below 20 mg/m³, three have been in the mid-20s and the highest being 47 mg/m³. The operator maintains that as this is a wet system the BAT AEL is not relevant and an AEL of 50mg/m^3 is more appropriate based on the current performance of the system. In addition the West secondary vent is only used when the East secondary vent is unavailable (for example during maintenance or breakdown), approximately 10% of the time. The H1 risk assessment shows that emissions can be screened out as insignificant

In view of the infrequent use and the past performance of the plant we agree with the operator that an AEL of 50mg/m^3 is more appropriate. We have retained this limit and set quarterly spot sampling and notification of when the west secondary is used and why.

The requirement to monitor points A60 and A82, Vacuum Degasser 1 and 2, has been removed. An analysis of the dispersion model for the site (Improvement Condition 4.1.6 within Environmental Permit EPR/BL3838IW issued to Tata Steel's Scunthorpe Works in May 2012 which requires that the operator reviews the emission to air Environmental Impact Assessment on an annual basis) was undertaken with the 2 Vacuum Degasser release points, A60 and A82. The maximum calculated releases for each stack (37 and 74 kg) were put into the dispersion model that's run annually for the Improvement Condition and looked at the contribution that these two stacks make compared to the overall contribution from point and diffuse sources at the three main monitors:
<table>
<tr><td rowspan="2">AQ Monitor</td><td colspan="2">Contribution to annual average ambient pm_{10} concentration (in µgm^3)</td><td rowspan="2">Ratio A60 + A82: Whole site</td></tr>
<tr><td>Whole site</td><td>A60& A82</td></tr>
<tr><td>Rowland Road</td><td>1.3</td><td>0.00013</td><td>0.010%</td></tr>
<tr><td>East Common Lane</td><td>2.1</td><td>0.00019</td><td>0.009%</td></tr>
<tr><td>Low Santon</td><td>9.3</td><td>0.00176</td><td>0.019%</td></tr>
</table>
Making the worst-case assumptions that emissions will be at the highest calculated level, and that all the dust is PM_{10}, the impact of the two stacks is insignificant, representing at most no more than 0.02% of the overall contribution from the site. Overall BAT is met for all the dust collection systems</td></tr>
</table>

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
79	BAT for on-site slag processing is to reduce dust emissions by using one or a combination of techniques I. efficient extraction of the slag crusher and screening devices with subsequent off-gas cleaning, if relevant II transport of untreated slag by shovel loaders III. extraction or wetting of conveyor transfer points for broken material IV. wetting of slag storage heaps V. use of water fogs when broken slag is loaded.	CC	BAT I and the associated BAT AEL is not applicable. Slag crushing and screening is undertaken by a third party. However, Tata steel do use a number of techniques to control dust emissions when removing the slag and transferring to the Yarborough Metal Recovery Plant, such as the use of shovel loaders when where further processing is undertaken by a third party (Harsco Metals Group Ltd) under a separate permit. Water spraying and the use of fog cannons on the haul road are also undertaken during dry weather to minimise dust emissions during the transport of the slag. BAT is achieved
	The BAT-AEL for dust in the case of using BAT I is < 10 – 20 mg/Nm^3 (spot sample)		
80	BAT is to prevent or reduce water use and waste water emissions from primary dedusting of basic oxygen furnace (BOF) gas by using one of the techniques as set out in BAT 75 and BAT 76	CC	BOS scrubbing water is treated in clarifiers, with the collected sludge being processed in a filter press and the overflow water being re-circulated as scrubbing water. BAT is achieved

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
81	BAT is to minimise the waste water discharge from continuous casting by using the techniques in combination: The BAT-associated emission levels, based on a qualified random sample or a 24-hour composite sample, for waste water from continuous casting machines are: • suspended solids <20 mg/l • iron <5 mg/l • zinc <2 mg/l • nickel <0.5 mg/l • total chromium <0.5 mg/l • total hydrocarbons <5 mg/l	FC	In the initial regulation 60 response Tata referred only to the current techniques being used on site these being that wastewater from casting and vacuum generation is processed using clarifiers, overflow water is further polished in a sand filtration unit. Any residual oil is removed before the water is re-circulated. The system is blown down when turbidity, conductivity and/or chlorine levels exceed defined set-points. We sought additional information regarding releases of process water before dilution by non process waters and their discharge from emission points W4 and W6.Tata responded that generally the emission limits were being achieved though on occasions the suspended solids levels have exceeded the new BAT AEL limit of 20 mg/l following heavy rain due to surface water run-off. Not all of the parameters for which BAT-AELs are given are routinely monitored (i.e. iron, zinc <2 mg/l, nickel <0.5 mg/l and total chromium). Tata have commenced monitoring, early indication is that the BAT AEL's will be achieved without additional treatment measures being necessary. We have updated Table S3.8 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements from the 8th March 2016 in line with BAT and included an IC1 to demonstrate compliance by 2016. **See Section 7 Emissions to Water**
82	BAT is to prevent waste generation by using one or a combination of the following techniques (see BAT 8): And BAT is to manage in a controlled manner basic oxygen furnace process residues which can neither be avoided nor recycled.	CC	BOS filter cake (residue from waste gas treatment) is made into waste oxide briquettes (WOBs) which are re-charged as a raw material into the BOS process. All caster scale is returned directly to the sinter plant, as is black sand – the coarse component resulting from scrubber water treatment. Any excess BOS filter cake is recovered off-site by a third party (for example, by the cement sector). Slag production is minimised through effective process control (optimised flux additions) and unavoidably produced slag is processed by de-metalling, grading and weathering to form an aggregate product that is marketed externally by a third party (Lafarge Tarmac). A slag debris stream is generated within the plant and this too is processed by de-metalling. Fine fractions from this processing are used within the BOS process as a flux (lime) substitute. Metal fines from de-metalling are processed in the sinter plant. BAT is achieved.

BAT Conclusion No	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
83	BAT is to collect, clean and buffer BOF gas for subsequent use as a fuel.	CC	See also response to BAT 3. BOS gas is collected and cleaned for use as a fuel elsewhere within the installation. BAT is achieved
84	BAT is to reduce energy consumption by using ladle-lid systems.	CC	Ladle lid systems are employed on all the casters at Scunthorpe. These help maintain the desired thermal profile in the ladle and reduce back-end temperature drops.
85	BAT is to optimise the process and reduce energy consumption by using a direct tapping process after blowing	CC	Rapid analysis system has been developed which gives a sample that requires no further processing before analysis. Slag darts are used for slag stopping, and there are three ladle furnaces in the Scunthorpe BOS plant. Direct tapping is undertaken whenever feasible as determined by the quick tap model. BAT is achieved.
86	BAT is to reduce energy consumption by using continuous near net shape strip casting	NA	No strip products are produced, BAT is not applicable.
BAT Conclusions for Electric Arc Furnace (EAF) Steelmaking and Casting			
87 - 95	There is no EAF Steel making & casting undertaken at the site. Therefore, BAT Conclusions 87 to 95 inclusive are not relevant for this installation.	NA	BAT 87 to 95 inclusive are not relevant

6 Review and assessment of derogation requests made by the operator in relation to BAT Conclusions which include an associated emission level (AEL) value

The IED enables a competent authority to allow derogations from BAT AELs stated in BAT Conclusions under specific circumstances as detailed under Article 15(4):

By way of derogation from paragraph 3, and without prejudice to Article 18, the competent authority may, in specific cases, set less strict emission limit values. Such a derogation may apply only where an assessment shows that the achievement of emission levels associated with the best available techniques as described in BAT conclusions would lead to disproportionately higher costs compared to the environmental benefits due to:

> *(a) the geographical location or the local environmental conditions of the installation concerned; or*
>
> *(b) the technical characteristics of the installation concerned.*

As part of their Regulation 60 Notice response, the operator has requested a derogation from compliance with the AEL values included in the following BAT Conclusions 48, 49, 50, 51 and 56.

Although information was provided in their response to allow us to commence assessment of the derogation requests it was insufficient to enable us to complete the determination and further information was requested and subsequently supplied on 11th August 2014.

We have decided to grant the derogation requested by the operator in respect to the AEL values described in BAT Conclusion 48, 49, 50 and 51. We have set ELVs that are higher than the BAT-AELs in the Consolidated Variation Notice that will ensure suitable protection of the environment.

We have decided to refuse the derogation requested by the operator in respect to the AEL values described in BAT Conclusion 56 and have included the AEL value as an ELV in the Consolidated Variation Notice.
The justification for our decision to allow derogations in respect of the AEL values associated with BATs 48, 49, 50 and 51 is set out below.

6.1 Overview of the site and installation

Scunthorpe integrated steel works is situated in North Lincolnshire to the east of Scunthorpe town and produces long profile products - typically plate, rail sections and beams. It covers an area of over 10,000 hectares and has more than 100 emission points to air, 10 emission points to surface waters and numerous sources of fugitive emissions. It has 4 blast furnaces, though only 3 are permitted to operate. Liquid steel production at full capacity is approximately 4.5 million tonnes per annum

though this can be flexibly reduced by operating fewer blast furnaces. 3.15 million tonnes were produced in 2013.

The installation has several interrelated processes which are carried out sequentially: raw materials handling, coke production; sinter production; iron production; raw steel production; ladle metallurgy; continuous casting; hot and cold rolling and finished product preparation.

Two local Air Quality Management Areas have been declared for particulate matter emissions (PM_{10}): Scunthorpe AQMA which incorporates part of the town and an area to the east which includes the steelworks; and Lower Santon AQMA, a small area of land surrounding 3 houses. Most of the PM_{10} emissions come from site operations such as traffic movements and the handling and storage of dusty materials such as coal and iron ore, rather than the process releases from the coke ovens. Polycyclic Aromatic Hydrocarbon (PAH) levels measured at two locations near the site are above the European target values. (PAH emissions are normally associated with PM_{10} emissions so measures that reduce PAH emissions are addressed as part of the dust derogation request).

The installation includes 2 coke ovens:

Appleby Coke Ovens were built in 1938 with 2 batteries each with 33 gas gun ovens producing 6100 tonnes of coke per week. Two further identical batteries were commissioned in 1951 and two more in 1959. This gave a total coke production of 18,300t/wk. Batteries 5 & 6 were closed in the 1970's. Battery 1 was rebuilt to the original design in 1984. Batteries 2, 3 and 4 have been rebuilt to an OSC design that incorporated a thinner wall and so increased output.

Dawes Lane Coke Ovens were built in 1979 and consists of three batteries of twenty-five chambers producing slightly over 13,000 tonnes of metallurgical coke per week. The battery heating system is of an underjet design and uses only coke oven gas as fuel.

Coal is mixed and blended then transported to one of the two coke oven plants. The coal is charged to air tight ovens under a slight positive pressure where it is heated at a temperature of between 1200-1300°C for a period of approximately 18-24 hours to produce coke before being pushed out of the oven and quenched by water. After quenching the coke is transferred to the blast furnaces. The raw Coke Oven Gas (COG) driven off during the coking process is a complex mixture containing hydrogen, methane, carbon monoxide, carbon dioxide, water vapour, oxygen, nitrogen, hydrogen sulphide, cyanide, ammonia, benzene, aromatics, light oils, tar vapour, naphthalene, Polycyclic Aromatic Hydrocarbons (PAHs), other hydrocarbons, and condensed particulates.

The raw gas is cooled and cleaned to produce a fuel gas and by-products (tar, benzole (benzene, toluene, xylene), naptha oil, ammonium sulphate and concentrated ammoniacal liquor) which are sold, reused or sent off-site for disposal. The entire clean COG is used within the site as a fuel as it has the highest calorific value of the various process gases used as fuels. It is a constituent of mixed enhanced gas (MEG) used to fuel steam boilers and the steel mill re-heat furnaces. Excess gas may be stored or burned on a flare stack. Cooling and process waste

waters from the by-products plant are treated in a biological effluent treatment plant prior to discharge into the River Trent.

6.2 Derogation from BATs 48 and 49:

Tata requested a time limited derogation for BAT 48 and BAT 49 (IV) as described in the BAT conclusions on industrial emissions for coke, iron and steel production, 2012/135/EU.

BAT 48 is to reduce the sulphur content of coke oven gas (COG) by installing desulphurisation equipment to meet the BAT-AEL for hydrogen sulphide (H_2S). This will reduce sulphur dioxide (SO_2) emissions when COG is then used as a process fuel in the steelworks.

BAT 49 (IV) relates to the use of desulphurised COG as fuel in the coke ovens to meet the BAT-AEL set for SO_2 emissions.

Coke oven gas desulphurisation (COGD) equipment is not currently installed on either of the two coke oven plants at Scunthorpe. It is a technique that can be retro-fitted to existing coke oven plants.

6.2.1 The Derogation justification criteria from BATs 48 and 49:

The derogation request is based on the technical characteristics of the 2 coke oven plants. In particular, they argued that compliance cannot be achieved by the target date of March 2016, which would require them to shut down the operation of the coke ovens and purchase coke on the open market. Knock-on effects of this action would include the loss of COG for the combustion plant providing site services with a consequent purchase of natural gas or HFO and the rapid deterioration of the coke plant refractory linings bringing forth a premature re-build of the coke works before a re-start once the COGD equipment had been installed

BAT 48 and 49 (IV) can be considered together because desulphurising all coke oven gas to comply with BAT 48 will ensure compliance with BAT 49 (IV). In practice, there is no direct release of H_2S because all cleaned COG is burned on site, converting the H_2S to SO_2. (Minimal amounts of raw COG may be released prior to flaring from the battery pressure relief system for safety purposes, but these are abnormal operations and hence excluded from BAT-AEL requirements).

We have reviewed the application for derogation from meeting the BAT–AELs for SO_2 and concluded:

- One of the examples of a technical characteristic described in Defra guidance is "the practicability .... of interrupting the activity so as to install improved emission control upon the pollutant(s)"[1].The application is based on a technical characteristic of the coke ovens and so it is within the scope of derogations allowed under article 15(4) of the Industrial Emissions.

- We accept that there is no realistic possibility of achieving compliance by March 2016, other than by shutting down both coke ovens in March 2016 and not restarting them until COGD has been installed, which would be 2019 at the earliest.

- The prolonged loss of coke production would have a significant negative impact on the viability of the integrated steelworks and may not be a feasible option for commercial and technical reasons. For example, Tata may not be able to source the required quantities of coke on the open market at a viable price and they would face the significant consequences of having no fuel coke oven gas for the steel mills - there is currently no natural gas supply to the site so they would have to incur the expensive construction of a dedicated pipeline, which might then be redundant when the new ovens were operational.

In order to assess whether a derogation can be allowed, the operator has to demonstrate that the costs of compliance with the BAT described is disproportionate to the damage that would be avoided if the BAT were employed due to the technical characteristics described above. Set out below is an estimate of the costs of compliance with the BAT and various alternatives, and thereafter is set out the costs associated with the harm avoided for the same options.

[1] "Industrial emissions Directive EPR Guidance on Part A installations" Defra, February 2013. Paragraph 4.41.

6.2.2 BAT 48 and 49 compliance cost estimates:

Tata provided cost estimates for three options for compliance, which are summarised below:

OPTION 1. Meeting the BAT-AELs 48 & 49 (IV) from March 2016 by closing the existing coke ovens until new ones fitted with COGD are ready to run in 2019.

OPTION 2. The sequential fitting of COGD to meet BAT-AELs 48 and 49 (IV) by March 2019 on the Dawes Lane Coke Oven and by January 2022 on the Appleby coke plant. Then replacing the existing ovens in 2026, 2031 or 2036.

OPTION 3. To replace the coke ovens in 2026 or 2031 or 2036. Tata had always planned to do this so they have defined this as their base scenario.

We have calculated the costs and benefits of meeting BAT-AELs in 2016 and compare these with the costs and benefits of delaying compliance with the BAT-AELs for SO_2 to 2019 and 2022.

The BREF states that the capital cost of installing COGD is around €30 million (£24M at €1 = £0.8) in a coke oven plant with about a hundred ovens (based on the ArcelorMittal steelworks). At Scunthorpe, Dawes Lane has 3 batteries – 75 ovens in total and Appleby 4 batteries each of 33 ovens - 132 ovens in total.

Tata provided estimated COGD costs in April 2014, based on recent quotations from equipment suppliers: capital costs Dawes Lane = £21.8M, Appleby = £34M and annual operating costs - Dawes Lane = £2.2M, Appleby = £2.34M.

In our review we identified four main issues associated with the costs information provided by Tata:

1 The cost of capital used by Tata in their assessment was 9.5%, which we felt was high. Oxera (2007)[2] estimated that 9.8% was the highest cost of capital across all the UK sectors; for this reason sensitivity analysis was carried out on this value.

2 The cash flow for the costs of capital estimated by Tata was kept constant across the appraisal period; this could imply that the cost of capital included not only the interest component of the payment but also the capital repayment, which would lead to double counting the capital investment; for this reason in our assessment, we have re-estimated the cost of capital assuming decreasing cash flow.

[2] Oxera (2007) Economic analysis for the Water Framework Directive - Estimating the cost of capital for the cost-effectiveness analysis, financial viability assessment and disproportionate costs assessment—Phase II, Prepared for Defra and the Collaborative Research Programme, June 20th 2007

3 Tata has assumed that the operating costs of the new coke ovens would be the same as the existing ones, with the exception of the additional costs of desulphurisation. It could be argued that the maintenance cost of new coke ovens will be lower than the existing costs, given that the ovens are now relatively old. To address this point, we have carried out sensitivity analysis on the difference between the operating costs of new and existing plants.

4 By closing the ovens to meet BAT-AELs in 2016, there would be no need to pay a large proportion of the operating costs, if any. These saving were not included in the Tata assessment.

We recalculated the costs for the 3 options proposed by Tata, taking into account the issues listed above but only using 2026 as the date when the coke ovens would be rebuilt (because this was the earliest date proposed by Tata). These were discounted using the discount rate given in Her Majesty's Treasury Green Book (HMT GB) to give the present values (PV) of each option.

Option	Present Value (£M)	Present value above baseline (£M)
1. Compliance with BAT-AELs for SO_2 and dust in 2016. (including coke oven shutdown 2016-19)	721	219
2. Compliance with BAT-AELs for SO_2 in 2019 and 2022 and dust in 2026 (this derogation request)	572	70
3. Compliance with the BAT-AELs for SO_2 and dust in 2026 (baseline case)	502	0

6.2.3 Environmental consequences of allowing a derogation for BAT 48 and 49

The annual emissions of SO_2 from the coke plants are currently 2,782 tonnes and these would reduce to less than 404 tonnes if the BAT AEL was met. If the configuration of the plant treating the gas from Dawes Lane is such as to eliminate emissions from ammonia incineration, then a further reduction of 212 tonnes per annum could be expected.

The residual hydrogen sulphide (H_2S) concentrations associated with BAT48 determined as daily mean averages, are <300 – 1000 mg/Nm³.

The mean H_2S concentration in the coke oven gas at Dawes Lane in 2013 was 2560 mg/Nm³, (with a range of 1170 to 3980 mg/Nm³) and at Appleby the H_2S averaged 4030 mg/Nm³, (with a range of 3140 to 4850 mg/Nm³).

There are no emission limits set for sulphur dioxide in the current permit. Emissions are controlled by restricting the sulphur content of the coals used for coking to limit the concentration of hydrogen sulphide in coke oven gas to 5000mg/m^3 at ACO and 4500mg/m^3 at DCO. In the absence of direct monitoring of the emissions of sulphur dioxide arising from burning coke oven gas, Tata has assumed that 52% of the

annual pollution inventory emissions of SO2 for the site as a whole arise from the coke ovens and used ADMS to model the impact of emissions from the installation as a whole at sensitive receptors. This is consistent with previous assessments and represents a conservative approach.

We have reviewed the modelled impact data presented by Tata for the period 2007 to 2013 and agree with their submission.

The current short term impact of SO_2 peak emissions arising from coke under firing and the predicted levels when achieving the BAT-AEL are summarised below.

Coke under firing		EQS/EAL	Process Contribution Current (PC)		Process Contribution at BAT AEL	
Pollutant		µg/m^3	µg/m^3	% of EAL	µg/m^3	% of EAL
SO_2	15mins	266	25.80	10	5.16	2
	1 hour	350	22.30	6	4.46	1
	24 hour	125	0.60	0.48	0.12	0.1

Our assessment methodology for local air quality considers the current emissions of SO_2 to be insignificant because the process contributions are less than or equal to 10% of all 3 short term EU-EQS values. There is no long term EQS or EAL for SO_2 to compare against.

Current emissions from coke oven under firing contribute less than 10% of the all of the three short term EU EQS values (15 minutes, 1 hour and 24 hour). Based on the methodology included in the Environment Agency's H1 guidance note, this means that the Process Contribution attributable to these SO_2 emissions on local air quality would be assessed as having an insignificant environmental impact.

In addition to this assessment of impact on air quality, we have reviewed the impact on following habitats sites:

Special Areas of Conservation, Special Protection Areas and Ramsar located within 10Km of the Installation:

- Humber Estuary

Sites of Special Scientific Interest which are located within 2Km of the Installation:

- Risby Warren
- Broughton Farm Wood

Non-statutory local wildlife and conservation sites which are located within 2Km of the Installation

- Sawcliffe (LNR)
- Holme Hall Golf Course
- Sweeting Thorns
- Santon Wood East
- Santon Wood
- Ashbyville Lake

- Cottage Beck Road Grassland
- Winterton Road Pits
- Sawcliffe Reserve
- Brougton West Wood
- Rowland Road Grassland

There is no evidence that current performance results in the deposition of dust and associated vegetation smothering at any of the sites mentioned above. Therefore, we have confined our assessment to the impact of aerial SO_2 emissions only. Of all the sites listed above Risby Warren SSSI is the most sensitive to aerial SO_2 emissions having the tightest critical level set due to the presence of sensitive lichens and bryophytes and is the closest to the steel works.

Pollutant	Assessment Criterion	PC[3] at Risby Warren	PC as a % of criterion	Insignificant
SO_2	10 µg/m^3	1.8 µg/m^3	18%	No

As we can see the current levels of SO_2 emissions at Risby Warren are 18% of the critical level.

Risby Warren was first notified in 1966 and subsequently revised in 1986 and has therefore been present since the height of the steel industry manufacturing at the steelworks site. A review available on 17/05/12 on the Natural England website of the sites condition records that the site was unfavourable due to the cover of bracken and tor grass along with the frequency of positive indicator species. These issues need addressing by grazing and bracken control, which is covered by the higher level stewardship (HLS) agreement. A later review of the 26/06/2012 indicates that the site is Unfavourable – Recovering. Cover of tor grass and bramble has reduced considerably since 2009 due to grazing with Exmoor ponies and sheep. However the site is still unfavourable due to: too high scrub cover (mandatory attribute), too high frequency of ragwort, and too high cover of litter. Scrub is being addressed through a HSL agreement. Therefore despite the current SO_2 emissions being at 18% of the critical level we can conclude that allowing a derogation will not contribute to any of the current unfavourable indicators for this site or any sites of heritage, landscape or nature conservation, and/or protected species or habitat.

Current SO_2 emissions contribute to present background measurement which does not exceed the critical level. The proposed derogation will not lead to an increase in SO_2 emissions so the critical level will not be exceeded. Once the required improvements are made the SO_2 emissions will be reduced leading to a reduction of exposure at the site. The installation will not damage the features of the SSSI.

Current emission limit values will be maintained throughout the period of the derogation. Whilst emissions will be reduced when BAT is met the existing limits will in the interim prevent significant pollution of the environment or harm to human health.

Delayed implementation of fitting COGD will have no effect on Polycyclic Aromatic Hydrocarbons (PAH) emissions.

[3] Document Ref - BL3838IW 0788 - Dispersion Modelling Report 2013.doc dated 1/7/2014

6.2.4 Costs and Benefits consideration for BATs 48 and 49

We consider below the value of any environmental damage that would be avoided under the different options considered:

In the initial regulation 60 response received on 29th September 2013 no cost benefit analysis was undertaken. In the second regulation 60 response received on the 30th April 2014 Tata provided the Net Present Cost of an option and the base case (namely continuing to operate the existing plants without coke oven gas desulphurisation until such time as they would need to be rebuilt within the normal investment cycle). They divided this by the mass of SO_2 that would be abated by earlier installation of COGD to give the effective SO_2 abatement cost. We have recalculated the cost effectiveness figures using 2026 as the date when the coke ovens will be rebuilt and the HMT GB discount rates.

For option 1 – compliance with the BAT-AELs for SO_2 in 2016 by ceasing coke production in 2016 and rebuilding the coke plants with COGD immediately. For ten years (2016 to 2026), annual emissions would be 2,590 tonnes per annum lower than the base case (option 3). The effective SO_2 abatement cost would be (721-502) $x10^6$/ (25,900-0) = **£8,455 per tonne SO_2 abated**.

For option 2 (the derogation request option) – compliance with the BAT-AELs for SO_2 in 2019 and 2022. The annual SO_2 emissions attributable to DLCO would be 953 tonnes lower for 6 years = 5718 tonnes and those attributable to ACO would be 1424 tonnes lower for 3 years =4272 tonnes. The effective SO_2 abatement cost would be (575-502) $x10^6$/ (25,900- (5718 + 4272)) = **£4,588 per tonne SO_2 abated.**

Whilst we can see that these are large numbers, without monetising the benefits we cannot put them into context to determine whether the costs are significantly higher than the benefits. We have therefore monetised the benefits and undertaken our own cost benefit analysis using cost data provided by Tata and the change in emissions data for SO_2 and particulates.

We carried out a Cost-Benefit Analysis to assess whether the cost of compliance with the BAT-AEL by March 2016 was disproportionate compared to the environmental harm which would be avoided. We took all the costs and benefits of the proposal at various times and discounted them from future values to provide the net present values (NPV). This approach allows a fair comparison to be made of the costs and benefits. Where the NPV is positive, this would mean that the cost of compliance is less than the value of the damage that would have been avoided and that therefore the cost of complying with the BAT-AEL would not be disproportionate to the environmental harm which would be avoided. In the range of scenarios we considered, the NPVs calculated are mostly strongly negative meaning that the cost of compliance with the BAT-AEL is disproportionate to the environmental harm which would be avoided.

The benefits of reducing emissions of SO_2 were calculated using the Green Book[4] damage costs (£1633 per tonne of SO_2 at 2010 prices). We also used the damage costs proposed by the consultancy Eunomia[5], for the purposes of sensitivity analysis. As the aim of the assessment is to help to judge whether the costs of meeting BAT-AELs is disproportionately more than the benefits, we have calculated what are the additional costs and benefits of meeting BAT-AELs instead of delaying the implementation of BAT-AELS for SO_2 to 2019 and 2022. The results are presented in the table below:

The results have been presented showing first the NPV and then as a cost benefit ratio when only the SO_2 benefit are included; and then when also the PMs are included. The assessment assumes that in the time derogation option the new oven is replaced in 2026.

	NPV (£m)		Cost/Benefits	
Meeting BAT-AELs 48 and 49 (IV) by 2016	Green Book Central Estimate	Eunomia Recommended Values	Green Book Central Estimate	Eunomia Recommended Values
SO_2	-101	-32	5.7	1.4
SO_2 & PMs	-86	-19	3.4	1.2

Achieving BAT-AELs 48 and 49 by 2016 would generate costs that are higher than the benefits even when the Eunomia damage cost values for SO_2 are used, which are several times higher than the green book ones.

In our assessment we carried out a sensitivity analysis to include changing the cost of capital and operating costs.

The table below show the NPVs of meeting BAT-AELs by 2016 when the Eunomia damage costs values for both SO_2 and PMs are used. This is a conservative screen as Eunomia has the highest cost of harm and their figures are proposals that have not been agreed across Europe. If the NPVs are negative with the Eunomia values then they will be even more so when using the HMT GB values, which Defra has recommended in its guidance on IED.

NPVs (Eunomia, SO_2+PMs)		cost of capital 9.5%	8.0%	6.5%	5.0%
% difference between operating costs	0%	-42	-32	-22	-13
	10%	-36	-26	-17	-7
	30%	-24	-15	-5	5
	40%	-19	-9	1	11

[4] Valuing impacts on air quality, HM Treasury and Defra, May 2013.
[5] Ballinger, Holland & Hogg (2011) Use of Damage Cost Data for BAT Decision Making: Report for the Environment Agency of England & Wales

This shows that a positive NPV would occur only under a particular combination of assumptions namely where the operating costs of the new oven are 40% lower than those of the existing oven; lower cost of capital, 6.5% and using the higher damage cost estimate (i.e. from Eunomia (2011)). These are independent variables and we consider it unrealistic for all 3 to change at the same time to the extent required. We therefore accept that the cost of compliance is disproportionately higher than the value of the damage that would be avoided.

6.2.5 Conclusion for BAT 48 and 49 derogation assessment

We are satisfied that Tata has demonstrated that the cost of complying with the BAT-AEL by March 2016 is disproportionate to value of damage to the environment caused by delaying implementation until 2019 and 2022 at Dawes Lane and Appleby respectively.

The Environment Agency therefore allows this derogation request subject to the following conditions:

- Separate COGD units will be installed sequentially on each the 2 coke ovens. The first unit on Dawes Lane would be online by March 2019, the second at Appleby by January 2022. We consider that this is both practical and justifiable. This represents significant investment by Tata in equipment that will serve any future rebuild, thus future-proofing the installation.

- If the final agreed configuration of the COGD equipment means that the ammonia incinerator at Dawes Lane is no longer required then it will cease to be used.

- An improvement condition is to be set to provide progress reports in meeting BATs 48 and 49 (IV) and the associated BAT-AELs for SO_2.

6.3 Derogation from BATs 50 and 51

Tata requested time limited derogations from BATs 50 and 51 as described in BAT Conclusions on industrial emissions for coke, iron and steel production, 2012/135/EU.

BAT 50 is to install pushing abatement equipment to the coke ovens to meet a BAT-AEL for dust of < 20 mg/Nm^3. No abatement is currently fitted or limit set. Installation of a bag plant to meet BAT is expected to reduce the annual emissions of PM_{10} from 28.6 to 0.143 tonnes and PM2.5 from 8.5 to 0.377.

BAT 51 is to install coke quench towers to achieve the BAT-AEL for dust of < 25 g/t coke. Installation of coke quenching abatement equipment to achieve the BAT-AEL on both coke ovens is expected to reduce the annual emissions of PM_{10} from 19 to 7.2 tonnes and PM2.5 from 7.7 to 3.8 tonnes.

6.3.1 The derogation justification criteria

We have reviewed the application for derogation from meeting the BAT–AELs for dust to assess whether the application is based on the technical characteristics of the coke ovens and if so is within the scope of derogations allowed under article 15(4) of the Industrial Emissions Directive. The derogation requests are based on the technical characteristics of the two sets of coke ovens (Appleby Coke Ovens & Dawes Lane Coke Ovens) and we have considered them together because the operator has used the same arguments for both.

Tata makes the following arguments:

(i) The age of existing coke ovens plant, meaning that retrofitting pollution abatement equipment would have a more limited operational life, significantly increasing costs.

Appleby Coke Ovens has four batteries: battery 1 was re built in 1984, battery 2 rebuilt in 1999 and batteries 3 and 4 rebuilt in 1991. Dawes Lane has three batteries, all built in 1978/9. Thus 3 of the 7 seven batteries have been in operation for more than 20 years and a further 3 have been in operation for more than 30 years since the last rebuild. Both of the coke ovens therefore have a limited remaining lifetime. The BREF recognises that at existing coke oven plants, a site specific engineering solution for coke pushing abatement equipment will be required and Tata have argued that any equipment they install now cannot be re-used when the coke ovens are rebuilt. We accept this argument.

Tata also referred to the technical characteristic listed in the Defra guidance[6] "the general investment cycle for a particular type of installation". They argued that the early replacement of the coke plants in 2016 to comply with all the relevant BAT conclusions is outside of their investment cycle which might see them replaced in 2026, 2031 or 2036, although the long term investment strategy has not been agreed over this timescale.

Another of the technical characteristics given as an example in Defra guidance is "the intended remaining operational lifetime of the installation as a whole or of the part of it giving rise to the emission of the pollutant(s), where the operator is prepared to commit to a timetable for closure". While Tata has provided evidence that the limited remaining operational lifetime of the coke ovens increases the costs of complying with the BAT-AELs they had not committed themselves to a timetable for rebuilding or significantly modifying them to achieve new build standards (which is equivalent to a commitment to closure as mentioned in the Defra example).

(ii) The configuration of the coke ovens plant making it more technically difficult and costly to comply particularly in relation to ACO.

As highlighted above, the batteries were built at different times so they are not fully integrated making emissions control more complicated.

At ACO the configuration is such that it is not possible for a single coke transfer machine to service all four batteries. Coal conveyors pass between the two pairs of batteries preventing a coke transfer machine passing between battery 2 and battery 3. Therefore, two coke transfer machines are in operation. Each machine would require hoods to capture the pushing emissions doubling the costs compared to that of a typical plant of similar size where only one coke transfer machine is used. To avoid constraining battery operations, other elements of a pushing abatement scheme, such as the gas cleaning plant, would also have to be duplicated again doubling the cost compared to that of a typical plant.

Tata have considered constraining battery operation to prevent a situation where two ovens (one from batteries 1 and 2 and one from batteries 3 and 4) were pushed almost simultaneously to allow for a single bag plant to be installed but they have argued that the overall cost of pushing abatement would still be significantly greater than for the typical case.

A further problem is that the additional weight of a coke transfer car with a hood to capture pushing emissions requires significant civil engineering work to strengthen the bench on which the car runs along with the provision of a third rail. We accept that the configuration of the coke ovens will lead to increased costs, particularly in relation to ACO.

[6] "Industrial emissions Directive EPR Guidance on Part A installations" Defra, February 2013. Paragraph 4.41

Based on the evidence provided above, we have concluded that the application is based on the technical characteristics of the coke ovens and so is within the scope of derogations allowed under article 15(4) of the Industrial Emissions Directive.

In order to assess whether a derogation can be allowed, the operator has to demonstrate that the costs of compliance with the BAT described is disproportionate to the damage that would be avoided if the BAT were employed due to the technical characteristics described above. Set out below is an assessment of the options for compliance and an estimate of the costs of compliance with the BAT and various alternatives, and thereafter is set out the costs associated with the harm avoided for the same options.

6.3.2 BAT 50 and 51 Options Analysis

50. BAT for coke pushing is to reduce dust emissions by using the following techniques:

I. extraction by means of an integrated coke transfer machine equipped with a hood
II. using land-based extraction gas treatment with a bag filter or other abatement systems
III. using a one point or a mobile quenching car.

For the Appleby coke ovens Tata considered constraining battery operations to allow the installation of one bag plant serving both batteries (ACO1&2 and ACO3&4), though they did not have detailed quotes for this work and did not assess the cost effectiveness of this option. Tata have argued that this option would incur significant additional costs because it would require a larger coke transfer car equipped with a hood to capture emissions which would entail significant civil engineering work to strengthen the bench on which the car runs and the provision of a third rail. In addition to the capital costs, the operating cost would increase as a result of the electrical energy required for the extraction fans. Annual energy consumption for the two bag plants would be 2GWh. We accept this argument.

We have considered Tata's assessment of these and agree that using an integrated coke transfer machine with a hood (BAT I) followed by a land based extraction system (BAT II) on **each** coke transfer machine is the best option.

BAT 51 concludes that Operators should use any **one** of the three alternative techniques listed to reduce dust emissions from coke quenching.

> *I. using coke dry quenching (CDQ) with the recovery of sensible heat and the removal of dust from charging, handling and screening operations by means of a bag filter*
>
> *II. using emission-minimised conventional wet quenching*
>
> *III. using coke stabilisation quenching (CSQ).*

The operation of BAT I would entail a major change in the whole coke works and was not considered.

Tata are currently using BAT II using emission minimised conventional wet scrubbing.

BAT III was rejected as being unavailable due to space constraints on the existing ovens, which is listed in the BAT Conclusions as an applicability criterion.

There are two quench towers at Appleby and one at Dawes Lane. All are equipped with baffles to reduce dust emissions. None of the existing quench towers achieves the BAT-AEL of <25 g dust/tonne coke. Mean emission factors, based on the non-isokinetic Mohrhauer method, are 102 g/tonne at Dawes Lane, 271 g/tonne for No. 1 quench tower at Appleby (batteries 1 and 2) and 590 g/tonne for Appleby's No. 2 quench tower.

The Bref recognises that retrofitting is possible only if the quenching tower is suitable. Otherwise a new tower must be installed and the costs are much higher.

Tata propose that both existing quench towers at Appleby are to be extensively refurbished before 2016 (including raising the height of the lower tower above the minimum height of 30m), with the aim of achieving at least an 80% reduction compared to current emissions from coke quenching. However there is no guarantee of the emissions levels that will be achieved by this refurbishment and further improvement may be required to comply with the BAT-AEL.

We have considered Tata's assessment of these and agree that using emissions minimised conventional wet scrubbing is the only practical technique. Further improvement will be required to reduce emissions to a minimum in order to comply with the BAT-AEL.

6.3.3 BAT 50 and 51 Compliance Costs assessment

Tata has provided evidence on the cost of delivering the identified practical options: For meeting the BAT 50 AELs by 2016:

- the capital cost for installing pushing emission abatement technology at DLCO has been estimated to be £17m; the operating costs would comprise electricity for fan (£0.08m/annum) and maintenance costs at 2% of capital for first ten years of operation (£0.34m/annum) then 4% of capital for subsequent years (£0.7m/annum).

- the capital cost for installing pushing emission abatement technology at ACO has been estimated to be £30m; the operating costs would comprise electricity for fans (£0.09m/annum) and maintenance costs slightly above those at DLCO: respectively £0.43m/annum for first ten years of operation then £0.85m/annum for subsequent years.

For meeting the BAT 51 AELs by 2016:

- the capital cost for installing three quench towers on the Scunthorpe coke plants has been estimated to be £12.3m; No operating costs were associated with this capital expenditure.

6.3.4 Environmental consequences of allowing a derogation for BAT 50 and 51

We have assessed the environmental consequences of the approach proposed. Installation of coke pushing abatement equipment to achieve the BAT-AEL on both coke ovens is expected to reduce the annual emissions of PM10 from 28.6 to 0.143 tonnes and PM2.5 from 8.5 to 0.377 tonnes.

Installation of coke quenching abatement equipment to achieve the BAT-AEL on both coke ovens is expected to reduce the annual emissions of PM10 from 7.8 to 3.2 tonnes and PM2.5 from 3.9 to 3.0 tonnes.

The table below summarises the current predicted short term impact of PM_{10} & $PM_{2.5}$ emissions at Rowland Road arising from coke pushing and coke quenching.

Source	Pollutant	EQS/EAL $\mu g/m^3$	Process Contribution (PC) $\mu g/m^3$	% of EAL
Pushing	PM_{10} (24 hour mean)	50	0.42	0.84
Quenching		50	0.13	0.26

Current particulate emissions from coke oven pushing and quenching, despite not achieving the various BAT-AELs for dust, contribute less than 10% of the short-term Air Quality Standards for PM_{10} and $PM_{2.5}$. Based on the methodology included in the Environment Agency's H1 guidance note, this means that the Process Contribution attributable to these dust emissions would be assessed as having an insignificant environmental impact. We agree with Tata that the coke oven emissions are not significant.

Our compliance work with Tata in improving dust control at the site has shown a steady downward trend in the number of PM_{10} exceedances at the local air quality monitoring sites. Since 2014 PM_{10} emitted from the **site as a whole** has not breached the EQS AQS objective. Any further reduction of PM_{10} releases as a result of BAT 50 and 51 compliance will have a minimal impact on the overall site emissions and would have no discernible effect on air quality.

As mention earlier in section 5.2.3 whilst there are number of habitats site within 10Km of the site, none are affected by dust emissions from the coke works. The delayed compliance with BAT 50 and 51 will have no impact on any of the habitat site.

6.3.5 Costs and Benefits consideration for BATs 50 and 51

Tata did not monetise the benefits and therefore did not carry out a cost benefit analysis. We have carried out the Cost Benefit Analysis for meeting BAT-AELs 50 and 51 by 2016.

The cost of capital used by Tata in their assessment of capital cost was 9.5%; the cost cash flow associated with the costs of capital had been estimated by simply multiplying the costs of capital for the capital investment, generating in this way a constant annual value across the appraisal period.

In our review of the cost information provided by Tata we identified two main issues:

- The cost of capital used by Tata in their assessment (9.5%) was felt to be on the high end of the possible range for this value. (Oxera (2007[7]) estimated that that 9.8% was the highest cost of capital across all the UK sectors); for this reason a sensitivity analysis was carried out for this parameter;

- The cash flow of the costs of capital estimated by Tata was kept constant across the appraisal period; this could imply that the cost of capital estimated included not only the interest component of the payment but also the capital repayment, which would lead to double counting; for this reason we have re-estimated the cost of capital assuming a decreasing cash flow.

In our assessment we have used the decreasing cash flow of cost of capital and kept the cost of capital at 9.5%; but then we tested how the final results would change by decreasing the cost of capital to 8.0%, then to 6.5% and finally 5.0%.

The cash flow of all costs and benefits for respectively meeting BAT-AELs 50 and 51 were discounted using the HMT GB discount rate. The sum of the discounted costs was then subtracted to the sum of the discounted benefits to derive the NPV. We calculated also the cost benefit ratio by dividing the sum of the discounted costs by the sum of the discounted benefits.

The table below summarises the NPVs and cost / benefit ratio to meet BAT-AELs 50 and 51 by 2016 with our assumption (i.e. decreasing cost of capital cash flow) using respectively the HTM GB central estimate and the Eunomia recommended values. Where the NPV is negative then the costs are greater than the environmental benefits achieved and this would be result in a positive cost benefit ratio.

[7] Oxera (2007) Economic analysis for the Water Framework Directive - Estimating the cost of capital for the cost-effectiveness analysis, financial viability assessment and disproportionate costs assessment—Phase II, Prepared for Defra and the Collaborative Research Programme, June 20th 2007

		NPV (£m) Green Book Central estimate	Eunomia Recommended value	Cost/Benefits Green Book Central estimate	Eunomia Recommended value
Meeting BAT AELs 50 by 2016	At DLCO	-43	-45	7.2	11.7
	At ACO	-70	-74	6.9	11.1
Total for BAT AELs 50		-113	-119	7.0	11.3
Meeting BAT AEL 51		-24	-26	7.6	12.4

From this data, it can be seen that achieving BAT-AELs 50 and 51 by 2016 would generate costs that are significantly higher than the benefits irrespective of the damage cost values used and which would be disproportionate.

We have tested how the results would change if we were to use lower values for the cost of capital. The results of the sensitivity testing are presented in the table below

NPV Green Book	Cost of Capital 9.5%	8.0%	6.5%	5.0%
BAT AEL 50	-113	-103	-93	-83
BAT AEL 51	-24	-22	-19	-17

In the case of BATs 50 & 51 the changes in the cost of capital only marginally changed the NPV, which remains negative irrespective of the value used.

6.3.6 Conclusion for BAT 50 and 51 derogation assessment

Tata has demonstrated that the costs of meeting BAT-AELs prior to rebuilding or modifying the coke ovens will be disproportionate compared to the benefits that could be achieved. Our sensitivity analysis showed that a positive NPV would not occur under any scenario.

Tata based their derogation request and cost benefit analysis on three possible dates of 2026, 2031 and 2036 for rebuilding the coke ovens or modifying them to achieve new build standards. Tata did not commit to a particular date but we will require the rebuilding or modification to achieve new build standards by 2024. This date has been chosen as it is the date when the next revision of this BREF (due in 2020) has to be implemented, and we want to ensure that any upgrading required as a result of this second revision can be delivered at this site. We consider this to be a reasonable timescale, balancing costs against environmental benefits in a proportionate manner.

The Environment Agency therefore allows this derogation request subject to the following conditions:

- The BAT-AELs for dust emissions from coke pushing and coke quenching will be specified in the permit with a compliance date of 8th March 2024.

- An improvement condition will be set in the permit requiring Tata to provide a progress report by 8th March 2016 on the refurbishment of the two quench towers at Appleby Coke Ovens in achieving the BAT AEL of <25 g dust/tonne coke.

6.4 BAT 56 derogation assessment

Tata requested a delay in meeting BAT56 "BAT for pre-treated waste water from the coking process and coke oven gas (COG) cleaning is to use biological waste water treatment with integrated denitrification/nitrification stages.

Tata has an existing Biological Effluent Treatment Plant (BETP) but it does not include denitrification/nitrification stages. It discharges into the tidal river Trent. The BAT-AEL for total Nitrogen is <15-50 mg/l and the current discharge is typically 75-128[8] mg/l.

The scope of the derogation was on the basis that the technique being currently "not available" at Scunthorpe. They said that they need to carry out research using a pilot plant to understand how best to treat their effluent. They will use that knowledge to design and install modifications to their existing BETP that will include denitrification/nitrification stages to achieve the BAT-AEL. Their timescale is to complete pilot plant trials by mid-2016 and installation the BETP modifications in 2017. Availability is not a relevant criteria in Article 15(4).

Tata has not made a case for being granted a derogation, in relation to the 3 criteria (geographical location, local environmental conditions or technical characteristics).

We do not accept the derogation request and have required the operator to deliver the relevant BAT by 8th March 2016.

[8] Tata response to Reg60 notice – section 8.2 of extra information supplied on 30 April 2014.

7 Emissions to Water

The consolidated permit incorporates the ten current discharges to controlled waters identified as W1 to W10.

Our review of the emission limits considered the BAT conclusions and also whether the current limits will maintain River Quality Objectives (RQOs) in the receiving watercourse to ensure the water quality objectives under Water Framework Directive will be met through improvements identified in the Operator's Water Improvement plan.

The relevant waste water BAT-AELs from the BAT Conclusions are:

- BATc 56 (Coke Ovens) for W10 emission point
- BATc 67 (Blast Furnaces) for W1 emission point
- BATc 81 (Concast) for W4 and W6 emission points.

Where amendments are required for reasons other than achieving these BAT-AELs, they are driven by recent ecological studies and other Water Framework Directive assessments.

The local water body GB104028064290 (Bottesford Beck Catchment) was previously classified as "Bad status" from assessments during 2009 and 2010, based on the invertebrate component of the Water Framework Directive. Since 2011, the classification showed improvement to "Poor status" based on wider criteria such as invertebrates, ammonia and phytobenthos. The principal watercourses in this water body are Brumby Beck and Bottesford Beck. Their head waters are of poor quality as largely made up of Combined Sewer Overflow discharges from Scunthorpe town. Additional pressures and stresses are put on the upper water body via inputs from the steel plant. The rest of Bottesford Beck receives water from numerous small drains in the largely low lying agricultural surroundings resulting in improved quality moving toward the River Trent.

Additionally, the W10 Biological Effluent Treatment Plant discharges directly to the River Trent.

We have used the opportunity of this permit review to harmonise the way we describe parameters to make them consistent with our M18 Water Monitoring Guidance. This makes comparison between installations more meaningful. As an example, where the discharge of lubricant oils (which are hydrocarbons) needs to be monitored, we now require this to be assessed as "Total Hydrocarbons", rather than "Total Mineral Oil and Hydrocarbons" as in the current permit.

We have revised the definition for “total metals” at various discharge points to be more targeted to toxic heavy metals as a suite and be consistent with the way the BRef BAT Conclusion for waste water collectively expresses these. The parameter is now listed as “Heavy Metals as the sum of Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Mercury (Hg), Nickel (Ni), Lead (Pb), Zinc (Zn) and their compounds expressed as metal”. When monitoring “Total Metals”, we mean the sum of all metals and their compounds expressed as metal where the measured value exceeds the Limit of Detection.

The amendments we have made for each of the discharge points is set out below:

W1 - Blast Furnace and BOS process waters with local site drainage to and from the Seraphim Lagoon.

We have set a new parameter and limit for Total Organic Carbon (TOC) of 20.0 mg/l. We have required this to be monitored weekly. We have set a further requirement that, if this limit is exceeded, a more complex and time consuming Biological Oxygen Demand for 5-day (BOD_5) analysis will be made against it with a 20 mg/l limit.

Overall Ammonia levels in the water body still fail to meet Water FD requirements. The target for the water body is to achieve “Good status”. The Bottesford Beck WB is classified as a Lowland and High alkalinity topology with a Total Ammonia ‘good’ target of 0.6 mg/l as a 90%ile according to Environment Agency guidance[9]. To contribute to meeting this target, an ammonia emission limit of 3.5 mg/l is required. We have therefore reduced the limit from 4 mg/l to 3.5 mg/l.

We have increased the monitoring frequency for Total Hydrocarbons from twice a month to weekly due to two serious oil pollution incidents in 2014 and 2015.

In line with BATc 67 AEL for Blast Furnace waste waters, we have maintained the emission limit value of 30 mg/l for suspended solids though increased the monitoring frequency from quarterly to monthly as this is more statistically meaningful.

We have retained the existing emission limit values for lead and zinc of 0.08 mg/l and 0.7 mg/l respectively. These are tighter than the AEL of 0.5 mg/l and 2 mg/l in BATc 67, and are derived from a previous environmental impact assessment to protect the local water body.

We have set an emission limit for iron at 5 mg/l which is in line with the AEL for BATc 67 for Blast Furnace waste waters.

W2 – Local site drainage from Steel Rail Section Mill, North area.

We have set a new parameter and limit for Total Organic Carbon (TOC) as explained for W1 to protect the local water quality.

[9] “H1 Annex E – Surface water discharges (complex)”, Issue 2.1, December 2011, page 19

To limit any effect on the status of Bottesford Beck due to suspended solids, we have reduced the emission limit for suspended solids from 50 mg/l to 30 mg/l. This is achievable at this point, and makes the discharge consistent with the BAT Conclusion levels expressed for other emission points.

To protect the quality of the water course and to limit metal dissolution, we require monitoring of the pH of the discharge and have set a limit that the pH cannot be < 5. We would normally set an upper limit for pH of 10, but because the discharge has a contribution from land drainage through land built from steel slag with a high lime content, this limit cannot be achieved in dry periods. We have therefore not set an upper limit for pH for this discharge point, but will review monitoring data to assess whether a future variation is required. We have set monitoring and reporting of pH data via a random monthly sample to allow trend analysis and to ensure no deterioration of the overall water body status of the Bottesford Beck under the Water Framework Directive is met.

W3 – Refers to Steel Rail Section Mill (SRSM) process water. Local site drainage from SRSM middle plus south ends and ore blending area.

We have set a new parameter and limit for Total Organic Carbon (TOC) as explained for W1 to protect the local water quality.

To protect the quality of the water course and to limit metal dissolution, we require Monitoring of the pH of the discharge and have set a limit for the pH range of 5 - 10. We have set monitoring and reporting of pH data via a continuous, well established part of the automated Steelworks Effluent Monitoring (EFFMON) system across several emission points (W1, W2, W3, W4, W6 and W9).

We have included a new water quality emission limit of 0.5 mg/l for Chlorine. This will allow process control to prevent or minimise the impact of any waste water blow down of the SRSM cooling water system. This approach is consistent with emission limits and monitoring set in W4 and W6.

W4 – Concast process water and local site drainage with Concast water softener unit and regeneration waste water

We have set a new parameter and limit for Total Organic Carbon (TOC) as explained for W1 to protect the local water quality.

We have set a new pH parameter with range limits pH 5 -10 as explained for W3 to protect the local water quality and to demonstrate no significant WQ or ecological impacts under the Water Framework Directive.

In line with BATc 81 for Concast waste water emissions, we have revised the emission limit values to be in line with the BAT-AELs as below:

- Iron - 5 mg/l
- Zinc - 2 mg/l
- Nickel - 0.5 mg/l
- Chromium - 0.5 mg/l
- Total Hydrocarbons - 5 mg/l
- Suspended solids - 20 mg/l

W5 –BOS and Concast plant site drainage Recycled surface water to BOS plant (Note this is Emergency Discharge point only).

W5 is an emergency discharge point which is only rarely used to prevent flooding of the molten steel making area during extreme storm conditions to avoid a major health and safety risk. Normally the waste water sump is pumped away to recycle.

We have re-instated the limits and monitoring of “Total Hydrocarbons” of 0.5 mg/l and suspended solids of 50 mg/l which was inadvertently deleted when variation EPR/BL3838IW/V007 was issued.

W6 – Emissions to Bottesford Beck arising from Concast process water and site drainage. Site drainage from the soaking pits, material off-loading area and the Briquetting plant area

We have set a new parameter and limit for Total Organic Carbon (TOC) as explained for W1 to protect the local water quality.

We have set a new pH parameter with range limits pH 5 -10 as explained for W3 to protect the local water quality and to demonstrate no significant WQ or ecological impacts under the Water Framework Directive.

In line with BATc 81 for Concast waste water emissions, we have revised the emission limit values to be in line with the BAT-AELs as below:

- Iron - 5 mg/l
- Zinc - 2 mg/l
- Nickel - 0.5 mg/l
- Chromium - 0.5 mg/l
- Total Hydrocarbons - 5 mg/l
- Suspended solids - 20 mg/l

W7 - Emissions to Bottesford Beck arising from Site drainage from the area of the former Redbourn works and north end Scunthorpe Plate Mill (SPM) to and from 'Goosehole' (ground water lagoon)

We have set a new parameter and limit for Total Organic Carbon (TOC) as explained for W1 to protect the local water quality.

We have simplified the monitoring of phenols to make it consistent with Technical Guidance M18 - Monitoring of discharges to water and sewer and to make the reporting consistent with other installations releasing Phenols. We require the monitoring of Phenols as "Phenol Index" (reported as mg/l phenol).

W9 –Emission to the Bottesford Beck arising from site drainage from part of the Rail Service Centre, Heavy Section Mill, the Structural Workshops and local Iron Foundry facility areas

We have set a new parameter and limit for "Phenol Index" as explained for W8.

W10 Emissions to the River Trent arising from the Biological Effluent Treatment Plant (BETP) treated effluent from Coke making and contaminated ground water

We have increased the monitoring frequency of Biological Oxygen Demand for 5 days (BOD_5) and suspended solids from twice a month to weekly to give more robust data.

In line with BATc 56 for coke oven waste waters, we have revised the emission limit values to be in line with the BAT-AELs as below:

- Chemical oxygen demand (COD) - 220 mg/l
- BOD_5 - 20 mg/l
- Sulphides - 0.1 mg/l
- Thiocyanate - 4 mg/
- Cyanide - 0.1 mg/l
- PAH - 0.05 mg/l
- Phenol Index - 0.5 mg/l

We have set a limit for sum of ammonia-nitrogen ($NH\ 4^{+}$-N), nitrate-nitrogen (NO_3^--N) and nitrite-nitrogen (NO_2^--N) of 50 mg/l which is tighter than the previous limit of 200 mg/l which was set for ammoniacal nitrogen (as N) only. This approach is sufficient to meet the requirements of the water framework directive (WFrD), ensuring no deterioration principles of the WFrD and individual elements of the River Trent are being met.

We have simplified the monitoring of phenols to make it consistent with Technical Guidance M18 - Monitoring of discharges to water and sewer and to make the reporting consistent with other installations releasing Phenols. We require the monitoring of Phenols as "Phenol Index" (reported as mg/l phenol).

8 Review and assessment of Chapter III IED derived permit review.

Unless the decision document specifies otherwise we have accepted the applicant's proposals.

Where relevant and appropriate, we have incorporated the techniques described by the Operator in their Regulation 60 Notice response as specific operating techniques required by the permit, through their inclusion in Table S1.2 of the Consolidated Variation Notice.

The variation notice now uses DEFRA LCP reference numbers.

The site has a total of nine boilers individual boilers with a total capacity of 529 MWth of which comprise of three LCP plants.

- There are three boilers at the LCP 341, Central Power Station (CPS) discharging into a common flue, emission point A201.

- Similarly the six boilers at the Turbo Blower House (TBH) discharge, in two groups, into two common flues, LCP 342, TBH Boilers 1 to 4 via emission point A202 and

- LCP 343 - TBH Boilers 5 and 6 via emission point A203.

Four of the boilers at TBH are individually below the 50 MWth threshold for consideration as LCPs, but are captured under the aggregation rules.

Compliance Route:

Tata has proposed to operate the LCPs by means of diminishing annual mass emission caps under the TNP. Under the TNP annual mass emission allowances decrease linearly year-on-year, between 1 January 2016 and 30 June 2020. These allowances are based on average performance of the plant from 2001 to 2010.

Net Rated Thermal Input:

The Applicant has stated that the Net Thermal Input of LCP 341 the Central Power Station is 265 MWth, the Net Rated Thermal Input for LCP 342 the Turbo Blower House Boilers 1-4 is 56 MWth and the Net Thermal Input for LCP 343: Turbo Blower House Boilers 5-6 is 180MWth. They have not provided any data to justify these figures in their responses of the 12/10/15 to the request for further information; we have therefore set an improvement condition to carry out performance testing by 31/12/16.

Minimum start up load and Minimum shut-down load:

The Operator has defined the “minimum start up load” and “minimum shut-down load” for the LCP in their response to the Regulation 60 notice dated 27/2/2015 and 102/10/2015, both in terms of the output load (i.e. electricity, heat or power generated) (MW); and this output load as a percentage of the rated thermal output of the combustion plant (%)

We agree with all of these definitions and have set these thresholds in the Permit in table S1.4 accordingly

Emission limits:

The operator has justified the emission limits on the basis of the following:

- The primary purpose of steel plant LCPs is to produce site essential services (e.g. steam for BF blowing and coke oven exhausters) and electricity generation for the site

- Steel plant LCPs are primarily fuelled from internal process gases, Blast furnace gas, Coke Oven Gas and BOS Gas-BOSG which have very different calorific values (CVs) and are variable in quality and quantity. Also variable quantities of supplementary heavy fuel oil (HFO).

- The emissions from these LCPs are strongly linked with the specific fuel mix available to each LCP and this mix will vary over both short and longer timescales, determined largely through other operations on the site.

We have taken these factors into account when setting new ELVs for the combustion units under the Transitional National Plan (TNP) under the IED which apply from 1st January 2016. We have set a tighter monthly average for SO2, NOx and dust and allowed flexibility by setting higher daily and hourly averages. See Schedule 3(a) Table S3.6 of the consolidated permit.

In Table S3.6 of Schedule 3(c) we have set tighter ELV’s in accordance with Annex V of IED when the TNP ends on 30th June 2020. This is on the basis that currently no natural gas is available. Should a natural gas supply become available then we will have to reassess whether the ELV’s need to be varied.

Notifications:

As there is no abatement plant associated with the LCP, Schedule 1 Notification of abnormal emissions, in the Core part of the permit, Part C (which takes account of abatement plant malfunction and breakdown notification requirements) is not required and has therefore not been included.

Monitoring & standards:

Standards for assessment of the monitoring location and for measurement of oxygen, water vapour, temperature and pressure have been added to the permit template for clarity.

Additional IED Chapter II requirements:

Condition 3.1.4 relating to protection of soil, groundwater and groundwater monitoring, has been added in compliance with IED requirements. Conditions 4.3.1 and 4.3.2 relating to notifications have been amended in compliance with IED requirements.

9 Review and assessment of changes that are not part of the BAT Conclusions and/or Chapter III IED derived permit review.

This document should be read in conjunction with the application, supporting information and permit/notice.

Aspect considered	Justification / Detail	Criteria met
		Yes
Receipt of submission		
Confidential information	A claim for commercial or industrial confidentiality has not been made.	✓
Identifying confidential information	We have not identified information provided as part of the variation application that we consider to be confidential. The decision was taken in accordance with our guidance on commercial confidentiality.	✓
Consultation		
Scope of consultation	The consultation requirements were identified and implemented. The decision was taken in accordance with RGN 6 High Profile Sites, our Public Participation Statement and our Working Together Agreements. For this application we consulted the following bodies: • North Lincolnshire Council • Public Health England • Food Standards Agency • Health & Safety Executive • Severn Trent	✓
The facility		
The regulated facility	A new listed activity has been added to Table S1.1 namely: 5.3 A(1)(a)(ii) Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day by physico-chemical treatment namely the treatment of oily millscale waste for the purpose of recovery (R4 Oily millscale (OMS) is produced in the water treatment plants at Concast and the Rolling Mills at Tata, Scunthorpe. OMS contains a significant quantity of iron but due to its high oil content it cannot be recycled at the Ore Blending Plant. Samples taken by Tata of the material indicate that it is hazardous waste and it has been given the waste code 10 02 11* - wastes from cooling water treatment containing oil. OMS contains a significant quantity of iron but due to its high oil content it cannot be recycled at the Ore Blending Plant. OMS is taken to the OMS pad within the installation boundary to be dewatered. When the OMS arrives at the area it is now being agitated using an allu bucket and placed on a concrete pad that drains to a series of lagoons that operate like an oil interceptor. The water is pumped to the SRSM water treatment plant before discharge via the permitted discharge point. The moisture content of the OMS is reduced to between 10% and 20% to facilitate its export to the Netherlands for further treatment to reduce the oil content. The output from the Dutch process is then returned to Tata for use in the ore blending plant. This new step of using an allu bucket to mechanically agitate the OMS is physico-chemical treatment and as more than 10 tonnes of OMS per day is processed it is a 5.3 A (1) (a) (ii) schedule activity.	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
European Directives		
Applicable directives	All applicable European directives have been considered in the determination of the application.	✓
The site		
Extent of the site of the facility	The consolidated installation boundary has been adjusted to more accurately match current operational requirements of Tata Steel as well as the other operators on site. The revised plan defines the extent of the site of the facility including discharge points to controlled waters. The operator is required to carry on the permitted activities within the site boundary. This is a multi operator installation and the plan includes the location of the other operators	✓
Site condition report	Millscale handling has always being undertaken on site and was therefore covered by the original site condition report. We consider this description is satisfactory but we are requiring the baseline report that was submitted to EA in 2002 to be reviewed under IED– guidance and templates (H5).	✓
Biodiversity, Heritage, Landscape and Nature Conservation	The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat. There are no point source dust emission to air. Emissions of dust from millscale handling are minimising by ensuring the millscale is kept damp. Even from larges point sources such as the coke ovens as discussed in section 5.2.3 of this document there is no evidence that current performance results in the deposition of dust and associated vegetation smothering at any of the habitats sites adjacent to the steel works. We have not formally consulted on the application. The decision was taken in accordance with our guidance.	✓
Environmental Risk Assessment and operating techniques		
Operating techniques	We have reviewed the techniques used by the operator and compared these with the BATc set out through IED. Our decision can be viewed through this decision document. In respect of the new listed activity the treatment of oily millscale. The proposed techniques/ emission levels for priorities for control are in line with the benchmark levels contained in the TGN “How to Comply with your Environmental Permit and the principles of S5.06 for hazardous waste operations and we consider them to represent appropriate techniques for the facility. In particular: • The pad, unloading area and lagoons are surrounded by a permeable bund. • OMS storage areas are clearly marked and signed with regard to the quantity and hazardous characteristics of the wastes stored therein. • Storage area drainage infrastructure is designed to ensure that all contaminated run-off is contained. • There is an inspection and maintenance programme for impervious surfaces and containment. • Following receipt, OMS is treated or removed off-site as soon as possible	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
The permit conditions		
Waste types	We have specified the permitted waste types, descriptions and quantities, which can be accepted at the oily millscale handling activity in Table S2.3 of the permit.	✓
Incorporating the application	We have specified that the applicant must operate the permit in accordance with descriptions in the application, including all additional information received as part of the determination process. These descriptions are specified in the Operating Techniques table S1.2 in the permit.	✓
Operator Competence		
Environment management system	There is no known reason to consider that the operator will not have the management systems to enable it to comply with the permit conditions. The decision was taken in accordance with RGN 5 on Operator Competence.	✓
Technical competence	Technical competency is required for activities permitted. The operator is a member of an agreed scheme.	✓

Annex 1: Improvement Conditions

Based in the information in the Operators Regulation 60 Notice responses and our own records of the capability and performance of the installation at this site, we consider that we need to set improvement conditions so that the outcome of the techniques detailed in the BAT Conclusions and Chapter III of IED are achieved by the installation. These additional improvement conditions are set out below - justifications for them are provided at the relevant section of the decision document.

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC1	For BATc 3, 8, 10, 11, 16, 25, 26, 56, 59, 60, 62, 65, 67 and 81 the operator shall submit a written report setting out progress to meeting BAT by 8th March 2016.	8th March 2016
IC2	For BATc: 48 & 49 the operator shall submit a written report setting out progress to achieving the ELV's where derogation has been granted. The report shall include, but not be limited to the following: 1. Current performance against the ELV after derogation period has elapsed for sulphur oxides (SOX), expressed as sulphur dioxide (SO2) of 500 mg/Nm3. 2. Associated targets / timelines for reaching compliance by 8th March 2019 for Dawes Lane Coke Ovens and Associated targets / timelines for reaching compliance by 31st January 2022 for Appleby Coke Ovens. 3. Any alterations to the initial plan submitted on 11/8/2014.	8th March 2016 and then every 6 months thereafter until the ELV after derogation period is met
IC3	For BATc: 49, 50 and 51 the operator shall submit a written report setting out progress to achieving the ELV's where a derogation has been granted. The report shall include, but not be limited to the following: 1. Current performance of dust emissions arising from under firing, coke pushing and coke quenching against the ELV after derogation period has elapsed. 2. Associated targets / timelines for reaching compliance on Dawes Lane and Appleby Coke Ovens by 8th March 2024. 3. Any alterations to the initial plan submitted on 11/08/14.	8th March 2016 and then every 6 months thereafter until the ELV after derogation period is met
IC4	Submit a written methodology and plan to the Environment Agency for approval for assessing visible emissions from the coke oven batteries. The methodology shall be as equivalent to BATc 44 and 46 requirements. The Operator shall implement the methodology and plan in accordance with the Environment Agency's written approval.	29th February 2016

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC5	Submit a written plan to the Environment Agency for approval on the measures to be taken to install a continuous Oxygen monitor to measure the oxygen content of the exhaust gas from emission point A1 of the Sinter Plant. Where appropriate, the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The Operator shall implement the plan in accordance with the Environment Agency's written approval.	29th February 2016
IC6	Submit a written plan to the Environment Agency for approval of the measures to be taken to install commission and calibrate MCERT Continuous Emission Monitors by 8th March 2016 to Appleby coke oven battery stacks A302 and A303. These are to continuously monitor nitrogen oxides arising from under firing (as NOx corrected to 5% oxygen standard) as daily mean values as required by BATc 49 (II). Where appropriate, the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The Operator shall implement the plan in accordance with the Environment Agency's written approval.	29th February 2016
IC7	Submit a written summary report to the Environment Agency to confirm by the results of calibration and verification testing that the performance of Continuous Emission Monitors for parameters as specified in Schedule 3(a) Table S3.1 emission point A1 complies with the requirements of BS EN 14181, specifically the requirements of QAL1, QAL2 and QAL3.	8th March 2016
IC8	The operator shall review the site condition report (SCR) and site protection monitoring plan to ensure Article 22 of the Industrial Emissions Directive is complied with. The Operator shall submit revised SCR to the Environment Agency in the format detailed in the 'European Commission Communication on Baseline reports (2014/C 136/03)'.	Within 1 year of permit variation issue and thereafter, at intervals of no more than 4 years

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC9	The operator shall provide a report in writing to the Environment Agency which provides the net rated thermal input for LCP341, LCP342 and LCP343. The net rated thermal input is the 'as built' value unless the plant has been modified significantly resulting in an improvement of the plant efficiency or output that increases the rated thermal input (which typically requires a performance test to demonstrate that guaranteed improvements have been realised). Evidence to support this figure, shall be in the form of: a) Performance test results during contractual guarantee testing or at commissioning (quoting the specified standards or test codes), unless this is not available in which case it shall be in the form of b) Performance test results after a significant modification (quoting the specified standards or test codes), unless this is not available in which case it shall be in the form of c) Manufacturer's contractual guarantee value, unless this is not available in which case it shall be in the form of d) Published reference data, e.g. Gas Turbine World Performance Specifications (published annually); unless this is not available in which case it shall be in the form of e) Design data, e.g. nameplate rating of a boiler or design documentation for a burner system; unless this is not available in which case it shall be in the form of f) Operational efficiency data as verified and used for heat accountancy purposes, unless this is not available in which case it shall be in the form of g) Data provided as part of Due Diligence during acquisition.	31st December 2016

Annex 2: External Consultation and web publicising during the consultation of the Regulation 60 response that detailed how the Operator would comply to the BATc

Three responses were received:

North Lincolnshire Council and HPE both drew our attention to the Air Quality Management Areas nearby and the exceedances of Air Quality Standards for particulate matter. They also drew our attention to past measurements of polyaromatic hydrocarbons (PAHs) that had exceeded the UK Air Quality Objective and European target values. We were reminded that population exposure to air pollutants such as particulate matter and PAHs is associated with adverse impacts on public health; they support the efforts being made by the operator and EA as regulator to reduce emissions from the site to air and to deliver long-term improvements to local air quality. They accepted that significant expenditure was required to improve the coke ovens to achieve BAT but given the age of the coke oven batteries and the local air quality would welcome an earlier date for meeting BAT. Our approach to the derogation applications is discussed in section 6.

One member of the public expressed concern about the health effects living close to the steel works and as such requested that no time extension should be given for improving the coke ovens and maintains that more improvements should be undertaken to improve air quality.

We are satisfied that the installation does not cause significant pollution of the environment or harm to human health and that improvements will be achieved as quickly as practicable.

Our assessment of the measures being taken to reduce the impact of air quality and timescales is set out in Sections 5 and 6 of this document. As discussed in Section 5 we are not fully satisfied with the steps being taken and have included new permit conditions (3.7) to ensure that an appropriate air quality management plan will be in place for the whole site. This plan will be a dynamic document which will include measurable and assessable targets and require an annual review. Having these targeted permit conditions that are more extensive, more prescriptive will deliver improved regulation and control.