PCI Facility Modification Application

Statement of Environment Effects
DA 154-05-00

BlueScope Steel (AIS) Pty Ltd

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1. Introduction

1.1. Project overview

BlueScope Steel (AIS) Pty Ltd (BlueScope) is a leading manufacturer of flat steel products in Australia. Port Kembla Steelworks (PKSW) is an integrated steelworks which currently produces steel using Blast Furnace – Basic Oxygen Furnace (BF-BOF) technology. Iron is produced at the blast furnace via a thermochemical reaction of iron ore, coke, and flux materials before it is converted to steel in the basic oxygen furnace.

Pulverised coal is injected into the blast furnace to improve production capability, process efficiency and reduce the total amount of coke used in the ironmaking process. The Pulverised Coal Injection (PCI) facility at PKSW has been in operation since 2002 and currently processes approximately 1,250 tonnes of coal per day. The PCI facility is operated under Environment Protection Licence 6092 and subject to development consent DA 154-05-00 issued by the Department of Urban Affairs and Planning (10 August 2000).

The development consent has since been modified 4 times with modifications summarised in Table 1-1.

Table 1-1:Modification details for DA 154-05-00

Modification Approval Reference	Date	Modification Details
DA 154-05-00 MOD 1	4 July 2002	Removal of the proposed installation of a radial stacker for stockpiling PCI feed coal; construction of three yard conveyors and associated receival bins for blending; and construction of a conveyor to transport and discharge PCI feed coal into the existing receival hopper.
DA 154-05-00 MOD 2	2 September 2008	Removal of pulverised coal injection limits of 200kg of pulverised coal per tonne of hot metal for each blast furnace.
DA 154-05-00 MOD 3	2 May 2017	Amendment of the conditions overseeing the sourcing of new coals for use at the PCI Facility, and modification to the environmental reporting requirements from annually to triennially.
DA 154-05-00 MOD 4	15 December 2022	Modification for the trial and permanent use of biochar in the PCI facility.

The use of PCI at the blast furnace is beneficial to the ironmaking process. However, it is a non-renewable source of fuel. In line with BlueScope's circular economy goals, BlueScope has been investigating the substitution of a portion of the pulverised coal with Activated Char Undersize (ACU). This material is generated from the screening process at the Sinter Plant Waste Gas Cleaning Plant.

BlueScope proposes to trial, and if successful, introduce the addition of ACU in the pulverised coal injection process.

1.2. Reasons for the modification

DA 154-05-00 was approved based on the supporting Statement of Environmental Effects (SEE). As the SEE only assessed the potential environmental impacts of the use of coal at the PCI facility, coal was the only material currently eligible for processing. The most recent modification to the consent enabled the processing of biochar (a char product derived from sustainable biomass) at the PCI facility. This modification application seeks to allow the processing of an alternative char product, ACU, at the facility.

This modification report has been prepared for the Department of Planning, Housing and Infrastructure (DPHI) by BlueScope under section 4.55(1A) of the Environmental Planning and Assessment Act 1997 (EP&A Act) in accordance with *State significant development guidelines – preparing a modification report: Appendix E to the state significant development guidelines July 2021* to enable BlueScope to proceed with trials and if successful, the ongoing processing of ACU at the PCI facility.

1.3. Proponent details

The proponent, BlueScope Steel (AIS) Pty Ltd (ABN 19 000 019 625) is a wholly owned subsidiary of BlueScope Steel Limited (BSL) (ABN 16 000 011 058). BlueScope is the owner and operator PKSW, including the PCI Facility.

1.4. Site setting

The PKSW is located in the Wollongong Local Government Area, within an industrial site of approximately 750 ha. It is situated approximately 80 kilometres south of Sydney and is surrounded by the suburbs of Port Kembla, Warrawong and Lake Heights to the south, Cringila and Unanderra to the west, and Figtree, Mount St Thomas, Coniston and Wollongong to the north.

The PKSW site comprises of the No.1 Works, No.2 Works, and Steelhaven. The No.2 Works is further subdivided into the Recycling Area, Rolling Mills, and the Cokemaking, Ironmaking and Steelmaking areas. The PCI facility is located within the boundary of the PKSW (Lot 1 DP 606434), in the northern section of the Cokemaking area.

The facility is located approximately 1,400 m from the nearest residential receivers. The activities proposed in this modification will be contained within the existing site.

Figure 1 - Project site locality

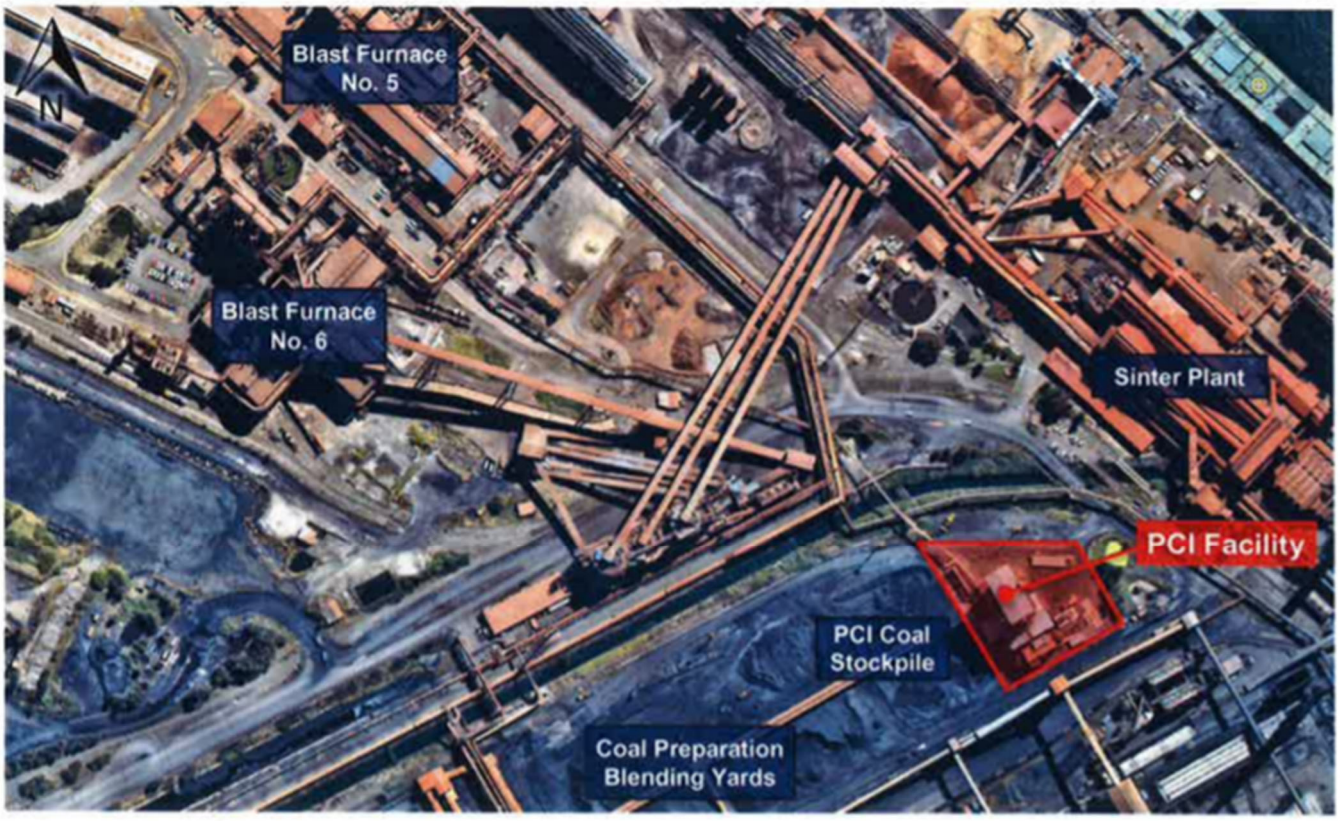

Figure 2 - Plant area location

1.5. PCI Facility process overview

Coal is fed through hoppers onto a fully enclosed vertical lift feed coal conveyor to a storage bin. The coal from the storage bin is then fed to the Grinding and Drying plant via variable speed enclosed drag chain conveyors, where it is pulverised to a fine powdered product. The aim is to grind the coal such that 75 - 80% of the material has a particle size less than 90 microns.

Hot gas is also fed into the Grinding Mill to dry the pulverised coal. The Hot Gas Generator is a burner arrangement, which uses a mixture of Blast Furnace Gas and air to generate Hot Gas with a temperature of approximately 300ºC. The hot gas containing pulverised coal is passed through a Fine Bag filter (similar to a baghouse) to remove the pulverised coal and transported to the Fine Coal Bin via a drag chain conveyer. The filtered hot gas is passed through a condenser to remove excess dust and humidity. It is then recycled through the Hot Gas generator to increase the temperature to 300ºC for re-use in the Grinding.

From the Fine Coal Bin, pulverised coal is fed into an injection hopper which feeds the pulverised coal into a pipeline and is pneumatically conveyed for injection into the blast furnace.

A process diagram is provided as Figure 3.

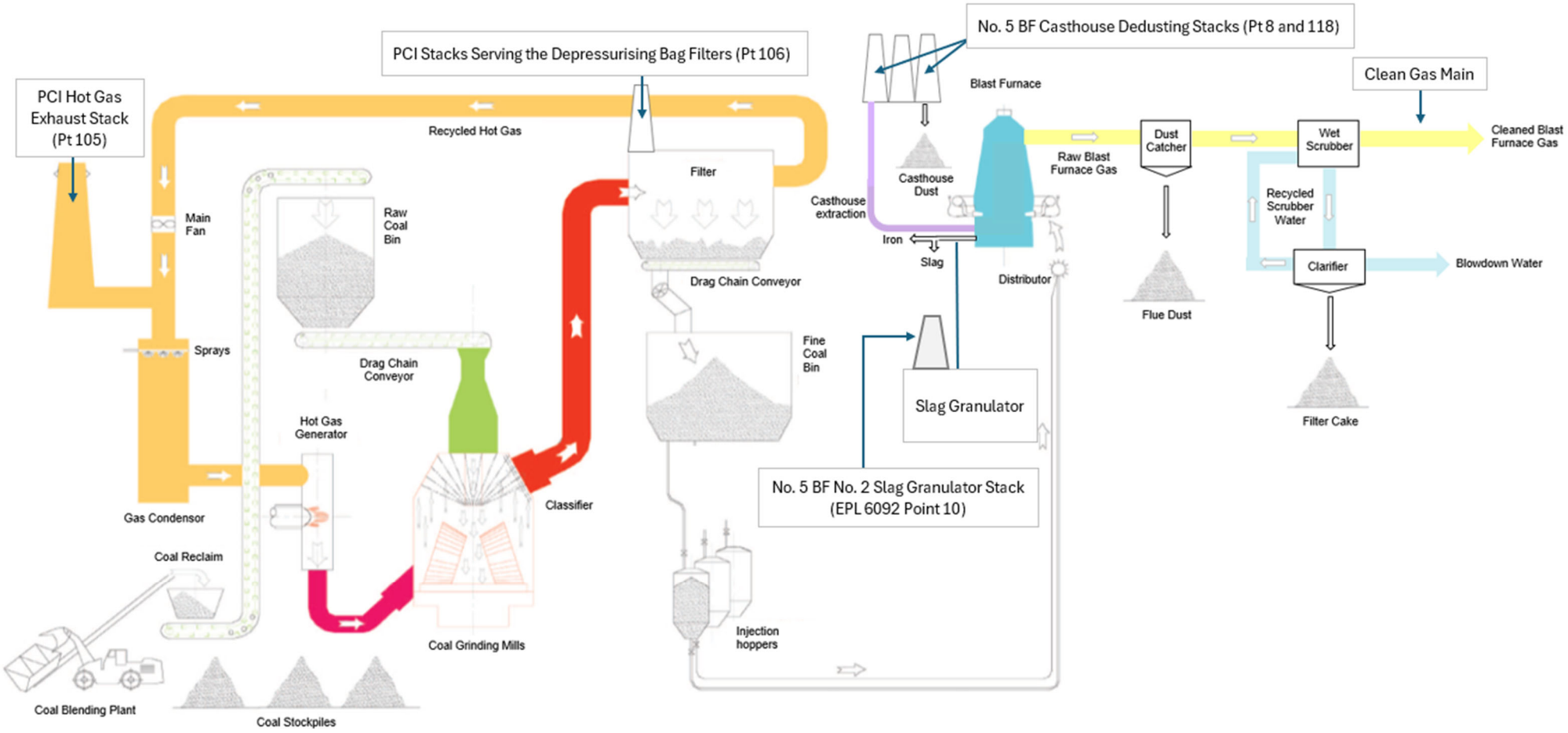

Figure 3 - PCI Facility process and output streams

2. Strategic context

BlueScope aspires to a circular economy, maximising the recovery of outputs and avoiding disposal. Where practical, by-products of the steelmaking process are used as substitutes for virgin raw materials to promote a circular economy and reduce consumption of natural resources. Examples include the use of gypsum and slag in cement manufacture.

The proposed modification helps to achieve this aspiration by recovering a material generated from the screening process at the Sinter Plant Waste Gas Cleaning Plant (ACU) and using it in the steelmaking process instead of disposing of it. The ACU contains approximately 50% free carbon, providing an opportunity for PCI coal substitution.

ACU management options have been considered in accordance with the EPA Waste Hierarchy in Figure 4.

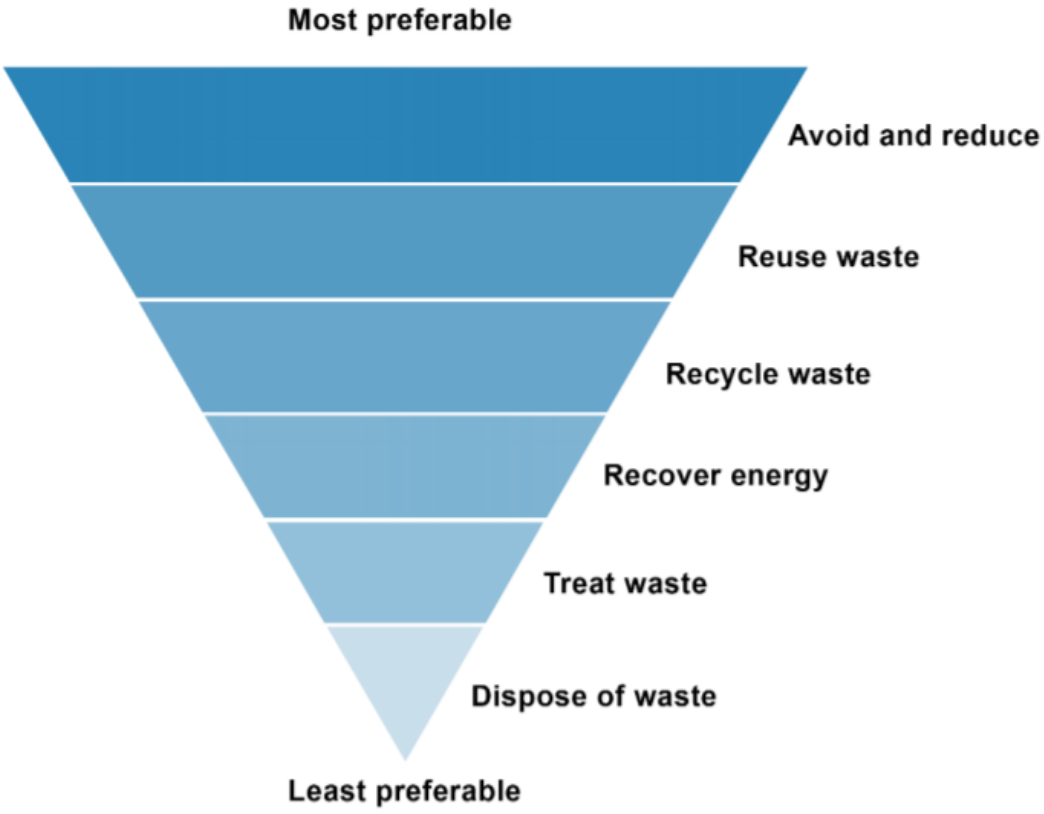

Figure 4 - EPA Waste Hierarchy

Avoidance of future arising's of ACU cannot be achieved. However, BlueScope has optimised the screening process through which this material is generated to reduce the amount of ACU produced. Approximately 4 tonnes per day of ACU is generated.

To manage these arisings, BlueScope proposes to reuse the carbon-rich ACU material at the PCI facility as a substitute for a portion of pulverised coal. This option complies with the waste hierarchy and meets BlueScope's goals of waste reduction.

3. Description of modification

3.1. Proposed modification

The proposed modification involves the replacement of PCI coal with char, with the pulverisation and injection processes remaining consistent with existing operations. As the ACU contains higher concentrations of metals and sulphur compared to current sources of pulverised coal, its addition to the PCI Facility will be limited to 2% of the PCI facility feed. No infrastructure is required to be built or modified to accommodate addition of the char, therefore there are no construction or commissioning requirements for the proposed modification.

This assessment seeks the addition of new conditions to DA 154-05-00 to allow the trial and future processing of ACU at the PCI facility to enable its use as a blast furnace injectant and reduce the amount of PCI coal used in the ironmaking process.

3.2. Activated Char Undersize

The Waste Gas Cleaning Plant (WGCP) was commissioned in 2003, with the aim to reduce waste gas emissions from the Sinter Plant. Gas cleaning is achieved by subjecting the gas to activated char which adsorbs molecules from the gas.

Activated char is derived from a coal of suitable type which has been ground and charred to remove volatile components, mixed with a binder, extruded to form cylindrical granules and then cured. It is then 'activated' by subjecting it to superheated steam, creating intensive porosity so that each granule has a large surface area to provide sites for adsorption of other molecules. Fines are generated via physical degradation due to char moving through the circuit to maintain temperature and avoid creating 'hot spots', and chemical reaction loss. The char is screened to remove the ACU material which has a mean particle size of 380 µm.

ACU was previously disposed of under EPA immobilisation approval SIA2008-S-05. However, it is currently stockpiled in the Steelworks 21 Processing Area (Figure 1) as potential reuse options are explored. For the proposed reuse option, the stockpiled ACU will be transported to the PCI Facility via internal roads at PKSW.

A comparison of the composition of PCI coal and ACU is shown in Table 3-. As noted above, ACU addition will be limited to 2% of the PCI facility feed due to the higher metals and sulphur concentrations in the ACU. It is proposed to process up to 25 tonnes per day. The allowance for processing at a higher rate will allow the current stockpile to be processed within 2 to 3 years. Once the existing stockpile is consumed and daily arisings are the only source of recovery, the ACU addition will be reduced to approximately 0.3%.

Table 3-1: Comparison of PCI coal and ACU composition

Analysis	Units	Pulverised Coal		ACU	
		Average	Range	Average	Range
Total Sulphur	%	0.46	0.32 – 0.83	3.51	0.39 – 6.56
Carbon	%	81	73 – 89	50	40 – 59
Antimony	mg/kg	0.09	<0.5 – 0.46	<10	<10 – 30
Arsenic	mg/kg	0.91	<0.5 – 7.7	18	<10 – 130
Barium	mg/kg	55	<0.5 – 340	145	82 – 220
Beryllium	mg/kg	0.71	<0.5 – 6	<10	<10
Cadmium	mg/kg	<0.5	<0.5 – 0.13	11	<10 – 44
Chromium	mg/kg	3.2	<0.5 – 20	25	12 – 52
Cobalt	mg/kg	3.5	<0.5 – 16	<10	<10 – 12

Analysis	Units	Pulverised Coal		ACU	
		Average	Range	Average	Range
Copper	mg/kg	11	2 – 18	57	<10 – 175
Lead	mg/kg	4.4	1.7 – 7.9	601	49 – 2,200
Manganese	mg/kg	30	<0.5 – 200	309	30 – 1,600
Mercury	mg/kg	<0.2	<0.2 – 1.38	29	9.8 – 69
Molybdenum	mg/kg	0.24	<0.5 – 0.67	<10	<10 – 34
Nickel	mg/kg	7.5	0.67 - 36	19	<10 - 39
Selenium	mg/kg	0.30	<0.5 - 1	349	130 – 610
Silver	mg/kg	<0.5	<0.5	<10	<10
Tin	mg/kg	<0.5	<0.5 – 1	<10	<10
Vanadium	mg/kg	11	1.4 – 47	25	11 – 51
Zinc	mg/kg	11	<0.5 – 28	189	47 – 520
Fluoride	mg/kg	160	100 - 270	1,837	9.4 – 5,383

The average ACU composition is based on monthly composite data from samples collected between July 2011 and April 2023.

3.3 Trial of ACU Addition at PCI Plant

A comprehensive trial is proposed to be undertaken for the addition of ACU at the PCI plant following approval being granted by the DPHI to modify the existing development consent. A copy of the trial plan has been provided in Appendix A of this report. The trial plan outlines the environmental monitoring and testing required to be conducted to ensure compliance with relevant legislative requirements and BlueScope's Environmental Protection Licence (EPL 6092). The objective of the trial is to collect accurate and reliable information on the reuse of ACU and to demonstrate that the environment and human health are protected at all times. The expected outcome of the trial is that there will be no tangible increase in the concentration of analytes discharged via licensed discharge points, or accumulated by-products and waste streams associated with the Ironmaking process.

The trial is expected to run for approximately 5 to 6 weeks and will be conducted in various stages. BlueScope will endeavour to conduct the trial when normal operating conditions apply i.e. standard feed rates, hours of operation, raw steel production output, and raw material composition inputs. If in the event that abnormal/unstable conditions arise, the duration of the trial may be extended to ensure that the data obtained through the monitoring program is representative of normal ironmaking processes.

3.4 Amendments to Environmental Protection Licence 6092

Late 2024, a draft trial proposal was submitted to the EPA in relation to the proposed modification for the addition of ACU at the PCI facility. Following this submission, the EPA conducted a review of the trial plan confirmed that it addresses the key components necessary for the EPA to evaluate and support the proposed trial. A draft licence condition was drafted in preparation for the DPHI granting approval to modify the existing development consent. The details of the draft condition are as follows:

Attachment A: Draft Trial Condition

Trial of Activated Char Undersized in the Pulverised Coal Injection Plant

Background

Raw materials for iron making, including sinter, coke and flux (limestone) are charged into the top of the Blast Furnace. Hot blast air is injected through tuyeres at the base of the furnace. As chemical reactions take place in the furnace, a mixture of carbon monoxide (CO), hydrogen (H2) and other gases are generated.

The Licensee has made a number of changes to Blast Furnace operation over the years. In 2002 the Pulverised Coal Injection (PCI) plant commenced operation. The PCI plant injects pulverised coal directly into the blast furnace tuyeres replacing coke as a raw material and improving blast furnace productivity.

Activated Char is used within the Waste Gas Cleaning Plant (WGCP) which forms part of the Sinter Plant and Activated Char Undersize (ACU) is a by-product produced at the WGCP. The ACU is stockpiled at the Alliance and Recycling Area (A&R). The Licensee proposes to trial the substitution of a small portion of PCI coal with ACU in the pulverised coal injection (PCI) process. The ACU would serve as a raw material substitution (carbon from coal) and provide a fuel value. If the trial demonstrates the ACU can be added in an environmentally acceptable manner, the proposed process could allow the consumption of the ACU stockpiles and potentially consume ongoing arisings of ACU from the Sinter Plant.

The Licensee proposes to undertake baseline sampling followed by a 3 Stage trial involving the addition of ACU to the PCI feed at a rate limited to 2% of the PCI feed, equating to 25 tonnes per day (tpd). Pulverisation and injection processes are to remain consistent with existing operations.

A sampling program will be undertaken during the trial, intended to account for the distribution of constituents of ACU when added with the PCI feed and to quantify any potential impacts within the ironmaking process (i.e. downstream of the PCI process).

Aim

To collect accurate and reliable information on the use of ACU in the PCI Plant and demonstrate that the environment and human health are protected at all times.

Requirements

1. The Licensee must undertake the trial as described in the BSL *ACU Addition at the PCI Plant Detailed Trial Plan (Draft)* dated 27 March 2025 (the Trial Plan) held on EPA file DOC25/306873.

2. The Licensee must notify the EPA and the BlueScope Community Consultative Committee in advance of the trial start date, and the EPA at the completion of the trial.

3. The Licensee must undertake sampling as described in the Trial Plan (including analytes, sampling locations and sampling of ACU generated during the trial).

4. At the completion of the trial the Licensee must submit a report on the trial as described in Section 4 of the Trial Plan

Due Date: within 3 months of the completion if the trial

4 Statutory context

4.3 Environmental Planning and Assessment Act 1979 (NSW)

Section 4.55(1A) of the EP&A Act allows a consent authority to modify a consent if certain requirements are met, including that the consent authority:

(a) is satisfied that the proposed modification is of minimal environmental impact;
(b) Is satisfied that the development to which the consent as modified relates is substantially the same development for which consent was originally granted, prior to any modification of that consent;
(c) It has notified the application in accordance with the regulations and/or any relevant development control plan; and
(d) It has considered any submissions made in relation to the proposed modification within the time prescribed by the regulations or any relevant development control plan.

Section 4.55(3) requires the consent authority, in determining an application for modification of a consent, to take into account such of the matters referred to in section 4.15(1) of the EP&A Act as are of relevance to the development the subject of the application. The consent authority must also take into consideration the reasons given by the consent authority for the original grant of consent.

The matters set out in section 4.55(3) consist of, relevantly:

(a) The provisions of any relevant environmental planning instrument;
(b) The likely impacts of the development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality;
(c) The suitability of the site for the development;
(d) Any submissions made in relation to the application;
(e) The public interest.

The sections below discuss the relevant environmental planning instruments.

4.3.1 State Environmental Planning Policy (Transport and Infrastructure) 2021

State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) is the primary planning instrument which applies to the PKSW site, including the PCI Facility, with Chapter 5 of that SEPP being the chapter of particular relevance. The land on which the PCI Facility is located is zoned IN3 Heavy Industrial under the T&I SEPP. Part 5.2 of the T&I SEPP includes the land use table which specifies the following objectives for the IN3 zone:

(a) To provide suitable areas for those industries that need to be separated from other land uses.
(b) To encourage employment opportunities.
(c) To minimise any adverse effect of heavy industry on other land uses.
(d) To provide transport infrastructure and intermodal facilities.
(e) To allow a diversity of activities that will not significantly detract from the operation of existing or proposed industries.

The proposal is considered consistent with each of these objectives.

4.3.2 State Environmental Planning Policy (Resilience and Hazards) 2021

Each of Chapters 2 (Coastal Management), 3 (Hazardous and Offensive Development) and 4 (Remediation of Land) of State Environmental Planning Policy (Resilience and Hazards) 2021 (R&H SEPP) are of potential relevance to the proposal.

Coastal Management

The PCI facility is located on land which falls partly within the coastal environment area and partly within the coastal use area under Chapter 2, Coastal Management, of the R&H SEPP. The consent authority must not grant consent unless it has considered whether or not the proposed development is likely to cause an adverse impact on, relevantly:

- the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment,
- coastal environmental values and natural coastal processes,
- the water quality of the marine estate as defined in the *Marine Estate Management Act 2014*,
- marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms,
- Aboriginal cultural heritage, practices and places, and
- the cultural and built environmental heritage.

In addition, the consent authority must not grant development consent unless satisfied that—

- the development is designed, sited and will be managed to avoid an adverse impact of the kinds referred to in the SEPP, or
- if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or
- if that impact cannot be minimised—the development will be managed to mitigate that impact.

The potential environmental impacts of the proposed modification are discussed in section 6 of this SEE, but are considered to be minimal, and in particular are considered unlikely to cause any adverse impacts on the matters dealt with in Chapter 2 of the R&H SEPP.

Hazardous and Offensive Development

Chapter 3 of the R&H SEPP requires a person who makes a development application to carry out development for the purpose of a potentially hazardous industry to prepare a preliminary hazard analysis (PHA). "Potentially hazardous industry" is defined to mean:

> *"a development for the purposes of any industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality—*
>
> *(a) to human health, life or property, or*
>
> *(b) to the biophysical environment,*
>
> *and includes a hazardous industry and a hazardous storage establishment."*

Hazards currently present at the PCI plant include electrical and vehicular hazards, as well as the hazards arising from the use of moving mechanical equipment and the presence confined spaces. Additional hazards which could potentially give rise to an impact on the locality and/or human health, life or property, if not properly managed, are those associated with pressure energy and the use of toxic and asphyxiant gases. All of these hazards have been managed safely at the PCI plant since it commenced operation following the grant of the initial development consent in 2000. The subject of this modification application, that is, the proposal to trial the use of ACU in the PCI plant, will not change the hazard profile of the development and as such, preparation of a PHA is not required.

"Potentially offensive industry" is defined to mean:

> *"a development for the purposes of an industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would emit a polluting discharge (including for example, noise) in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land, and includes an offensive industry and an offensive storage establishment."*

The potential impacts of the proposed modification are discussed in section 6 below, allowing consideration of the matters which the consent authority is required to take into account pursuant to clause 3.12 of the R&H SEPP.

Remediation of Land

Clause 4.6 of the R&H SEPP provides that a consent authority must not consent to the carrying out of any development of land unless, relevantly:

- it has considered whether the land is contaminated, and
- if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and
- if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

The land on which the PKSW is situated has been declared to be contaminated land. BlueScope has carried out investigation of and reporting to the EPA of the contamination status of PKSW over more than a decade and the EPA has formally advised that it is appropriate for the contamination to be managed under the conditions of the EPL which applies to the land. The proposed modification will not result in any change in the way in which the PCI plant interacts with land on which it is located, and it is considered that the consent authority may be satisfied that the requirements of clause 4.6 of the R&H SEPP have been met.

4.4 Other NSW legislation

4.4.1 Protection of the Environment Operations Act 1997

The Protection of the Environment Operations Act 1997 is the key piece of environmental protection legislation in NSW. As well as provisions relating to air, noise, land and water pollution, it contains provisions requiring certain activities and premises to be the subject of environment protection licences. The PKSW, including the existing PCI Plant, is covered by environmental protection licence number 6092.

4.4.2 Biodiversity Conservation Act 2016

The Biodiversity Conservation Act 2016 (BC Act) establishes a framework to avoid, minimise and offset impacts of proposed development and land use change on biodiversity. Section 7.9(2) of the BC Act requires an application for development consent for SSD under Part 4 of the EP&A Act to be accompanied by a Biodiversity Development Assessment Report unless the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values.

Clause 30 of the Biodiversity Conservation (Saving & Transitional) Regulation provides that the BC Act applies to modification of planning approvals granted before commencement of the BC Act.

The proposed modification does not involve the removal of any native vegetation and the PCI Plant site does not provide potential habitat for any threatened fauna species. Therefore, no assessment of threatened species or ecological communities is required.

4.4.3 Heritage Act 1977

The Heritage Act 1977 provides protection of the environmental heritage of the State which includes places, buildings, works, relics, movable objects or precincts that are of State or local heritage significance. A key measure for the identification and conservation of State significant items is listing on the State Heritage Register (SHR) under Part 3A of the Heritage Act 1977. An application for approval must be made if development may result in direct impacts on an item on the SHR, however, there are no state listed items on the PKSW site. The Heritage Act also requires a permit to be obtained prior to disturbance or excavation which is likely to discover, expose, move, damage or destroy a relic, as defined in the Act. The nature of the proposed modification means that this requirement will not be triggered.

4.4.4 National Parks and Wildlife Act 1974

The Act aims to conserve the natural and cultural heritage of NSW. Amongst other things, where works will disturb Aboriginal objects, an Aboriginal Heritage Impact Permit is required. The nature of the proposed modification to the consent means that this requirement will not be triggered.

4.5 Commonwealth legislation

4.5.1 Environment Protection and Biodiversity Conservation Act 1999

The Environment Protection and Biodiversity Conservation Act 1999 aims to protect and manage matters of national environmental significance (MNES), including threatened species and ecological communities, migratory species (protected under international agreements), and National Heritage places. Any actions that will or are likely to have a significant impact on the MNES require referral and approval from the Australian Government Environment Minister. The nature of the proposed modification is such that this requirement is not triggered.

5 Engagement

The proposal to use ACU as a pulverised coal replacement has previously been discussed with the EPA and DPHI. A summary of the meeting purpose and issues raised are listed in Table 5-1.

Table 5-1: Summary of EPA and DPHI engagement

Date	Regulator	Purpose	Details
Routine liaison meetings with the EPA (every 6 weeks)	EPA	Discuss ACU project concept	Potential impacts to process outputs to be assessed.
6 September 2025	DPHI & EPA	Pre-Lodgement Meeting	Discussed the details of the draft report prepared for the application request to modify the existing consent.
26 November 2025	EPA	Site Tour NSW EPA Air Quality Branch	BlueScope facilitated a site tour for EPA officers from the Air Quality branch.
4 December 2025	EPA	Inspection of PCI Facility and Identification of Sampling Locations	Discussed key processes, outputs and sampling locations to be included within the proposed trial plan.
27 March 2025	EPA	ACU Trial Plan	Meeting organised to finalise the proposed trial plan.

BlueScope's Community Consultative Committee (CCC) meets once per quarter to discuss the company's performance and projects. The CCC will be notified of the trial and of its progress following approval of the modification application. A copy of the minutes from all CCC meetings is available on BlueScope's website - https://www.bluescope.com/illawarra/our-communities/community-consultative-committee.

6 Assessment of impacts

The proposed modification only relates to the materials processed through the existing PCI facility and does not involve the construction of additional infrastructure. As no construction phase is required for the modification, the impacts assessed relate only to the operation of the PCI facility.

Trace elements within materials processed at the PCI facility will disperse across the process output streams at the PCI facility and the Blast Furnace. The process outputs in which the elements may appear are shown in Figure 3 and include:

Table 6-1- Sampling Locations

Sample Point	Location	Justification for Sampling
EPL Pt. 106 – PCI Stacks serving the depressurising bag filters	PCI Facility – licensed discharge point	Potential for accumulation of analytes discharged via direct process related output streams
EPL Pt. 105 - PCI Hot Gas Exhaust Stack	PCI Facility – licensed discharge point	Potential for accumulation of analytes discharged via direct process related output streams
EPL Pt. 118 and 8 – No. 5 Blast Furnace Casthouse Dedusting Stacks 1 & 2	No. 5 Blast Furnace – licensed discharge point	Potential for accumulation of analytes discharged via indirect process related output streams
EPL Pt. 10 – No. 5 Blast Furnace Slag Granulator Stack	No. 5 Blast Furnace – licensed discharge point	Potential for accumulation of analytes discharged via indirect process related output streams
EPL Pt. 107 – Sinter Plant Waste Gas Cleaning Plant Stack	Sinter Plant – licensed discharge point	Flue dust, bag house dust is recycled back through the Sinter Plant.
No. 5 Blast Furnace Clean Gas Main (CGM)	No. 5 Blast Furnace overhead gas main sample point	Potential for accumulation of analytes discharged via indirect process related output streams
PCI Cooling Tower Blowdown	PCI Facility	Potential for accumulation of analytes discharged via direct process related output streams
Casthouse Baghouse Dust	No. 5 Blast Furnace	Potential for accumulation of analytes in waste streams
Blast Furnace Fluedust (dustcatcher)	No. 5 Blast Furnace	Potential for accumulation of analytes in waste streams
Blast Furnace Filtercake	No. 5 Blast Furnace	Potential for accumulation of analytes in waste streams
Blast Furnace Slag	No. 5 Blast Furnace slag pits	Potential for accumulation of analytes in by-product
Blast Furnace Iron	No. 5 Blast Furnace iron stream	Potential for accumulation of analytes in product stream
Blast Furnace Clarifier Blowdown	No. 5 Blast Furnace clarifier	Potential for accumulation of analytes discharged via direct process related output streams
ACU generated during the trial	Sinter Plant	Potential for cycling up of analytes in ACU

The impact assessment of the use of ACU at the PCI facility has been performed by using the maximum composition of coal and ACU (as provided in Table 3-1) to predict the concentration of potential contaminants of concern in the PCI feed at an ACU addition rate of 2% and 0.3%. This assessment approach is conservative and should provide an over-estimate of the potential impacts.

Table 6-2- Comparison of existing and predicted future PCI feed concentration

Analysis	Units	Existing feed concentration (0% ACU)	Predicted feed concentration during ACU stockpile consumption (2% ACU)	Predicted future feed concentration (0.3% ACU)
Total Sulphur	%	0.83	0.94	0.85
Carbon	%	89	88	89
Antimony	mg/kg	0.46	1.05	0.55
Arsenic	mg/kg	7.7	10	8.1
Barium	mg/kg	340	338	340
Beryllium	mg/kg	6	6	6
Cadmium	mg/kg	0.13	1.01	0.26
Chromium	mg/kg	20	21	20
Cobalt	mg/kg	16	16	16
Copper	mg/kg	18	21	18
Lead	mg/kg	7.9	52	14
Manganese	mg/kg	200	228	204
Mercury	mg/kg	1.38	2.73	1.58
Molybdenum	mg/kg	0.67	1.34	0.77
Nickel	mg/kg	36	36	36
Selenium	mg/kg	1	13	2.8
Silver	mg/kg	<0.5	<0.5	<0.5
Tin	mg/kg	1	1	1
Vanadium	mg/kg	47	47	47
Zinc	mg/kg	28	38	29
Fluoride	mg/kg	270	372	285

The predicted future PCI feed in Table 6-1 indicates a short-term increase of some metals during ACU addition at 2% feed concentration. The addition of ACU at 0.3% indicates that the predicted concentration of the feed remains relatively consistent with the existing PCI feed (0% ACU addition), with the majority of the predictions remaining equal to or withing 1mg/kg of existing feed. Minor increases are predicted for lead, manganese, selenium, and fluoride by 6.1mg/kg, 4mg/kg, 1.8mg/kg, and 15mg/kg respectively.

6.3 Air Quality

No new fugitive dust sources will be created as a result of the proposed modification. ACU is currently stored in a designated stockpile area at the PKSW. Consumption of this stockpile will result in reduced potential for dust emissions from this location and assist BlueScope with achieving the objectives of *PRP 170 – Prioritised Stockpile*

Management Plan. Potential dust emissions during consumption of the stockpile will be managed in accordance with BlueScope's Fugitive Dust and Stockpile Management Plan.

No new stack emission sources are proposed under this modification application. Metals present in the PCI feed largely partition to the solid output streams and may be emitted from the stacks as dust in the waste gas. The waste gas is subject to existing pollution control equipment, including:

- Bag filters at the PCI facility;
- Blast Furnace Casthouse Stacks; and
- Wet scrubbing used to clean the Blast Furnace Gas.

The following stacks will be monitored throughout the trial period:

- PCI Hot Gas Exhaust Stack (EPL 6092 Point 105);
- PCI Facility - Stacks Serving the Depressurising Bag Filters (EPL 6092 Point 106);
- No 5 Blast Furnace (5BF) Casthouse Dedusting Stacks (EPL 6092 Points 8 and 118)** bag filters;
- No. 5 Blast Furnace (5BF) – No. 2 Slag Granulator Stack (EPL 6092 Point 10);
- Sinter Plant Waste Gas Cleaning Plant Stack (EPL 6092 Pt. 107); and
- Although not a licensed discharge point, the No. 5 Blast Furnace Clean Gas Main will also be sampled.

These stacks are currently subject to regular sampling and compliance in accordance with conditions M2.2 and L3.4 of EPL 6092. Further, while metals are not required to be routinely tested at these stacks under EPL 6092, analysis of metals are undertaken at the PCI Hot Gas Exhaust stack and the No 5 Blast Furnace Casthouse Dedusting Stacks for National Pollutant Inventory emission reporting and are assessed against the limits stipulated in the Protection of the Environment Operations (Clean Air) Regulation 2022 for iron and steel primary production.

Results of recent stack testing undertaken at the PCI Facility and at the No. 5 Blast Furnace Casthouse Dedusting Stacks in accordance with EPL 6092 monitoring requirements, and for National Pollutant Inventory emission reporting and the respective concentration limits are provided in Tables 6-2 – 6-5.

Table 6-2 - PCI Hot Gas Exhaust stack (EPL 6092 Point 105) testing results

Date Sampled	Analysis	Units	Result	EPL 6092 Concentration Limit	POEO Clean Air Regulation (2022) Group 6 Limit
2 December 2024	Nitrogen Oxides	mg/m^3	<4	200	-
	Solid Particles	mg/m^3	4.7	20	20
8 February 2023	Solid Particles	mg/m^3	5	20	20
	Nitrogen Oxides	mg/m^3	<4	200	-
	Type 1 and Type 2 substances (jn aggregate)	mg/m^3	0.013	-	1
	Cadmium	mg/m^3	<0.000027	-	0.2
	Mercury	mg/m^3	0.00044	-	0.2
6 February 2023	Solid Particles	mg/m^3	3.3	20	20
	Nitrogen Oxides	mg/m^3	<4	200	-
	Type 1 and Type 2 substances (jn aggregate)	mg/m^3	0.028	-	1

	Cadmium	mg/m^3	0.000046	-	0.2
	Mercury	mg/m^3	0.0019	-	0.2
14 April 2022	Solid Particles	mg/m^3	3.8	20	20
	Nitrogen Oxides	mg/m^3	<4	200	-
6 June 2018	Type 1 and Type 2 substances (jn aggregate)	mg/m^3	0.022	-	1
	Cadmium	mg/m^3	0.000035	-	0.2
	Mercury	mg/m^3	0.0015	-	0.2

Table 6-3 – PCI Depressurising Bag Filter stack (EPL 6092 Point 106) testing results

Date Sampled	Analysis	Units	Result	EPL 6092 Concentration Limit	POEO Clean Air Regulation (2022) Group 6 Limit
14 February 2023	Type 1 and Type 2 substances (jn aggregate)	mg/m^3	0.016	-	1
	Cadmium	mg/m^3	0.00019	-	0.2
	Mercury	mg/m^3	<0.000020	-	0.2
8 February 2023	Solid Particles	mg/m^3	<2	20	20
7 February 2023	Solid Particles	mg/m^3	<2	20	20
6 February 2023	Solid Particles	mg/m^3	<2	20	20
14 April 2022	Solid Particles	mg/m^3	<2	20	20

Table 6-4 – No 5 Blast Furnace Casthouse Dedusting Stack 1 (EPL 6092 Point 8) testing results

Date Sampled	Analysis	Units	Result	EPL 6092 Concentration Limit	POEO Clean Air Regulation (2022) Group 6 Limit
21 October 2024	Solid Particles	mg/m^3	0.5	50	50
1 November 2023	Solid Particles	mg/m^3	8.6	50	50
14 February 2023	Solid Particles	mg/m^3	18	50	50
	Type 1 and Type 2 substances (jn aggregate)	mg/m^3	0.07	-	1
	Cadmium	mg/m^3	<0.000021	-	0.2
	Mercury	mg/m^3	<0.000021	-	0.2
7 February 2023	Solid Particles	mg/m^3	13	50	50
	Type 1 and Type 2 substances (jn aggregate)	mg/m^3	0.085	-	1
	Cadmium	mg/m^3	0.00002	-	0.2
	Mercury	mg/m^3	<0.000020	-	0.2
21 November 2022	Solid Particles	mg/m^3	26	50	50
9 August 2021	Solid Particles	mg/m^3	11	50	50

24 August 2017	Type 1 and Type 2 substances (jn aggregate)	mg/m^3	0.019	-	1
	Cadmium	mg/m^3	<0.00018	-	0.2
	Mercury	mg/m^3	<0.00018	-	0.2

Table 6-5 – No 5 Blast Furnace Casthouse Dedusting Stack 2 (EPL 6092 Point 118) testing results

Date Sampled	Analysis	Units	Result	EPL 6092 Concentration Limit	POEO Clean Air Regulation (2022) Group 6 Limit
13 October 2023	Solid Particles	mg/m^3	1.9	50	50
14 February 2023	Solid Particles	mg/m^3	1	50	50
	Type 1 and Type 2 substances (jn aggregate)	mg/m^3	0.023	-	1
	Cadmium	mg/m^3	<0.000021	-	0.2
	Type 1 and Type 2 substances (jn aggregate)	mg/m^3	<0.000021	-	1
7 February 2023	Solid Particles	mg/m^3	1.7	50	50
	Type 1 and Type 2 substances (jn aggregate)	mg/m^3	0.02	-	1
	Cadmium	mg/m^3	<0.000021	-	0.2
	Mercury	mg/m^3	<0.000021	-	0.2
23 November 2022	Solid Particles	mg/m^3	1.4	50	50
3 August 2021	Solid Particles	mg/m^3	5.2	50	50
3 May 2018	Type 1 and Type 2 substances (jn aggregate)	mg/m^3	0.034	-	1
	Cadmium	mg/m^3	0.00062	-	0.2
	Mercury	mg/m^3	<0.00026	-	0.2

The recent stack sampling results provided in Tables 6-2 – 6-5 demonstrate compliance with the EPL 6092 and Protection of the Environment Operations (Clean Air) Regulation 2022, with all results significantly lower than the respective prescribed emission limits. A review of sampling results over the last ten years shows the PCI facility has a history of compliance to air emission limits, with no non-compliances occurring during the period.

Between 2009 and 2012, in accordance with the requirements of Pollution Reduction Program 131 of EPL 6092, an air emissions model for the Port Kembla Steelworks site was prepared and validated by and independent third party. In the resulting report submitted to the EPA in September 2012, the results of the validated model indicated compliance to the EPA criterion at all sensitive receptors for all contaminants measured at the PCI facility and No 5 Blast Furnace Casthouse Dedusting stacks.

The air model has been used to assess the potential impact to local receptors from the predicted emissions during ACU addition. The air modelling accounted for the highest measured concentration for each analyte from the data set i.e. ACU addition accounting for 2% of the PCI facility feed rate or a maximum of addition rate of 25 tonnes of ACU per day. The predicted impacts for each of the sensitive receptors was compared to the pertinent impact assessment criteria. When considering the total emission data set for each analyte for the PKSW base and trial cases, the predicted impacts fall in the range from 0.003% to 7% of the impact assessment criteria. When considering the incremental change from the 25 tonnes per day ACU trial, the change ranges between 0% and

0.4% of the criteria. If the trial quantities continue until it is only new arisings being processed, then predicted impacts will fall accordingly. On the basis that the predicted incremental change to impacts is between 0% and 0.4% of the criteria, it is considered an acceptable change within the approved methods. A trial will be undertaken if the modification request is approved and will last approximately 5 to 6 weeks. Site testing during the trial will be used to validate modelling predictions.

6.4 Water Management

No new water discharges are proposed under this modification application.

Metals present in the PCI feed largely partition to the solid output streams and may be emitted in water discharges from the 5BF Thickener blowdown. A trace element study (TES) conducted in 2006 assessed the mass balance of inputs and outputs in the ironmaking process, including elements reporting to the blast furnace blowdown water.

The data from the trace element study coupled with recent data acquired under *PRP 182 - No.2 Blower Station Drain Characterisation Assessment* has been used to predict the potential impacts to the blowdown water from the proposed modification. The assessment uses the maximum ACU concentrations (refer Table 3.1) and assumes that the total additional metal load reports to the blowdown and is not removed in the No.5 Blast Furnace water treatment process. Therefore, the assessment is conservative and likely over predicts the potential impacts. Results of the assessment are presented in Table 6-6.

As the 5BF Thickener blowdown is not the sole contributor to discharges at the No.2 Blower Station (2BS) Drain, results of the blowdown water assessment are again coupled with data acquired under PRP 182 to assess the potential impacts to the 2BS Drain licenced discharge point (EPL 6092 Point 79). This assessment incorporates the three continuous inputs into the 2BS Drain:

- Saltwater Channel,
- Ironmaking East Drain (IMED) (EPL 6092 Point 89); and
- 5BF Thickener blowdown.

It uses the maximum concentration and flow acquired during PRP 182, regardless of whether these maximum conditions occurred during the same sampling event. An exception has been made for the 5BF Thickener blowdown flow, where a maximum flow of 45m^3/hr has been used despite it being higher than flows recorded during the PRP to account for the highest flow rate known to occur during operations. This methodology is considered conservative as it assumes the highest mass load of pollutants discharging to drain. The calculated results with and without the ACU addition are then compared to the concentration range recorded at the 2BS Drain during the PRP. The results of the assessment are provided in Table 6-7.

Table 6-6 - Assessment of impacts to the 5BF Thickener blowdown water

	Max ACU Addition (kg/yr)	TES Total BF Outputs (kg/yr)	Combined Output (kg/yr)	Ratio (Max ACU Addition: TES Total BF Outputs)	TES BF Blowdown Output (%)	Blowdown Base Case (kg/yr)	Blowdown with ACU Addition (kg/yr)	Maximum PRP 182 Blowdown Result (mg/L)	Predicted Blowdown Result (mg/L)
Antimony	274	56,898	57,172	1.0048112	0.00624	3.55	3.57	0.024	0.024
Arsenic	1,186	745	1,931	2.5930152	0.1588	1.18	3.07	0.01	0.026
Cadmium	402	222	624	2.8055111	0.03189	0.071	0.20	0.008	0.022
Chromium	475	445,910	446,384	1.0010641	ND	-	-	ND	ND
Cobalt	110	57,746	57,855	1.0018962	0.00164	0.95	0.95	0.0022	0.0022
Copper	1,597	114,926	116,523	1.0138948	0.01029	12	12	0.0077	0.0078
Lead	20,075	35,308	55,383	1.56857	0.06565	23	36	0.58	0.91
Manganese	14,600	13,866,584	13,881,184	1.0010529	0.00343	476	476	0.35	0.35
Mercury	630	28	657	23.6220657	ND	-	-	0.00024	0.0057
Molybdenum	310	143	454	3.1632005	0.6603	0.95	3.00	0.013	0.041
Nickel	356	546,785	547,141	1.0006508	0.00074	4.05	4.05	0.0071	0.0071
Selenium	5,566	*	*	*	*	*	*	0.013	*
Tin	ND	682	682	1	0.03469	0.24	0.24	0.0029	0.0029
Vanadium	465	3,325,524	3,325,989	1.0001399	0.00007	2.33	2.33	0.0083	0.0083
Zinc	4,745	296,044	300,789	1.016028	0.06663	197	200	1.45	1.47
Fluoride	49,120	2,045,522	2,094,642	1.0240134	0.1272	2,602	2,664	15	15

ND = Not Detected, sample result less than limit of reporting

* Insufficient data with which to make a prediction. A focus of the proposed ACU addition trial will be to complete this mass balance and to validate predictions.

Table 6-7 - Assessment of impacts at the 2BS Drain

	Units	Max 5BF blowdown without ACU addition (PRP 182)	Max 5BF blowdown with ACU addition (Prediction using Table 6-6 Ratio)	Max Saltwater Channel (PRP 182)	Max IMED (PRP 182)	Predicted 2BS Drain without ACU addition	Predicted 2BS Drain with ACU addition	2BS Drain Min (PRP 182)	2BS Drain Max (PRP 182)
Antimony	mg/L	0.024	0.024	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	mg/L	0.01	0.026	0.0019	<0.001	0.0019	0.019	0.0016	0.0019
Cadmium	mg/L	0.008	0.022	<0.0001	0.00021	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	mg/L	<0.001	<0.001	0.0013	0.0026	0.0013	0.0013	0.0014	0.036
Cobalt	mg/L	0.0022	0.0022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	0.0077	0.0078	0.0071	0.011	0.0071	0.0071	0.0019	0.0079
Lead	mg/L	0.58	0.19	0.0027	0.081	0.0040	0.0046	0.001	0.0031
Manganese	mg/L	0.35	0.35	0.048	0.26	0.050	0.050	0.01	0.55
Mercury	mg/L	0.00024	0.0057	0.00012	0.00018	0.00012	0.00013	<0.00005	<0.00005
Molybdenum	mg/L	0.013	0.041	0.014	0.33	0.016	0.016	0.011	0.014
Nickel	mg/L	0.0071	0.0071	0.0016	0.0022	0.0016	0.0016	0.0016	0.0021
Selenium	mg/L	0.013	0.013	<0.001	0.0011	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	0.0029	0.029	0.001	0.0027	0.001	0.001	<0.001	<0.001
Vanadium	mg/L	0.0083	0.0083	0.005	0.011	0.005	0.005	0.0024	0.061
Zinc	mg/L	1.45	1.47	0.016	0.17	0.019	0.019	0.0083	0.046
Fluoride	mg/L	15	15	4.5	7.3	4.5	4.5	<2	<10
Flow	m^3/hr	45	45	27425	144	27,614	27,614	25,312	33,192

The assessment shows an increase in concentrations of metals at the 5BF blowdown. Majority of these increases are minor and would not be detectable however, concentration increases for arsenic, cadmium, lead, mercury, and molybdenum would likely be observed in the 5BF blowdown based on the conservative assessment. These increases are predicted to be negligible at the 2BS Drain with minor increases of 0.0006mg/L and 0.00001mg/L for lead and mercury respectively.

6.5 Waste Management

The proposed modification is centred on waste reduction. No new waste streams will be created as a result of the modification. Existing wastes include:

- Waste oils/hydrocarbon mixtures;
- Sewage sludge and residues;
- Slag materials; and
- Dust

The quantity and classification of all waste streams are anticipated to remain unchanged because of the modification. All waste streams and management processes will remain consistent with existing operation.

6.6 Greenhouse Gas and Energy Efficiency

The most significant greenhouse gas and energy efficiency savings that will result from the addition of ACU into the PCI feed will be in relation to diverting the historically stockpiled ACU material from landfill. Approximately 20,000 tonnes of ACU material is currently stockpiled at the PKSW site and is increasing by approximately 4 tonnes per day. Offsite disposal options are likely to involve thermal and/or chemical treatment processes which are energy intensive. Additionally, the material will also need to be transported offsite via trucks to a licensed waste receival facility. Negating to requirement to dispose of the material by exploring reuse options will effectively eliminate the CO_2 emissions generated from long-distance truck movements.

Due to the lower carbon content of the material, the addition of ACU into the PCI feed will not result in any significant greenhouse gas reductions relating to the ironmaking process.

7 Justification of the modified project

In accordance with the requirements of EPL 6092, BlueScope has an ongoing commitment to prevent the continual growth of materials stockpiled at the PKSW site. Despite the range of effective dust suppression controls being implemented across the site, the EPA has encouraged BlueScope to identify reuse/recycling options for materials that do not currently have a defined disposal option. This is particularly important for stockpiles assessed to be higher risk due to the potential for greater dust emissions and/or current stockpile size. The ACU material stockpile has subsequently been categorised as a high risk thus requiring BlueScope to identify reuse options. The most viable option would be to add ACU into the feed at the PCI facility in a controlled manner at approximately 25 tonnes per day (or 2% of the current feed rate). The allowance for processing at a higher rate will allow the current stockpile to be processed within 2 to 3 years. Once the existing stockpile is consumed and daily arisings are the only source of recovery, the ACU addition will be reduced to approximately 0.3%.

Compliance monitoring undertaken at the PCI facility, and more broadly across the PKSW site, as outlined in EPL 6092, will continue to provide date to confirm that any modifications to the PCI plant will remain in accordance with the requirements of EPL 6092 and ensure that variations in the feed do not result in any material change in downstream emissions, as compared to historical performance.

Appendix A. Tial Plan for the Addition of ACU at the PCI Facility

ACU Addition at PCI Plant

Detailed Trial Plan

May 2025

Detailed Trial Plan for ACU Addition at the PCI Plant

1. Introduction

BlueScope has been investigating the substitution of a portion of the pulverised coal with Activated Char Undersize (ACU) at the PCI facility. This trial plan supports BlueScope's request to modify the existing development approval for the PCI facility (DA 154-05-00) and outlines the environmental testing and monitoring required to be undertaken to ensure compliance with relevant legislative requirements and BlueScope's Environmental Protection Licence (EPL) 6092. The objective of the trial is to collect accurate and reliable information on the addition of ACU at the PCI facility and to demonstrate that the environment and human health are protected at all times. The expected outcome of the trial is that there will be no tangible increase in the concentration of analytes discharged via licensed discharge points, or accumulated by-products and waste streams associated with the ironmaking process.

2. Proposal

The proposed modification involves the substitution of a small portion of PCI coal with ACU, where the pulverisation and injection processes remaining consistent with existing operations. ACU is produced at the Waste Gas Cleaning Plant (WGCP) which forms part of the Sinter Plant. The ACU is collected into a dry dust silo. On discharge from the silo, dry ACU passes through a plough shear mixer where water is added to convert the dust to a soil consistency in the truck (~10% moisture content). The ACU is transported by truck to a designated stockpile area at the Alliance and Recycling site (21 Area). BlueScope proposes to trial, and if successful, introduce the use of ACU in the pulverised coal injection (PCI) process.

As the ACU contains higher concentrations of metals and sulphur compared to current sources of pulverised coal, its addition to the PCI facility will be limited to 2% of the PCI feed. 2% of the PCI feed equates to 25 tonnes per day (tpd). No infrastructure is required to be built or modified to accommodate the addition of the char, therefore there are no construction or commissioning requirements for the proposed modification. A schematic showing the PCI process, including input and output streams is provided in Figure 1.

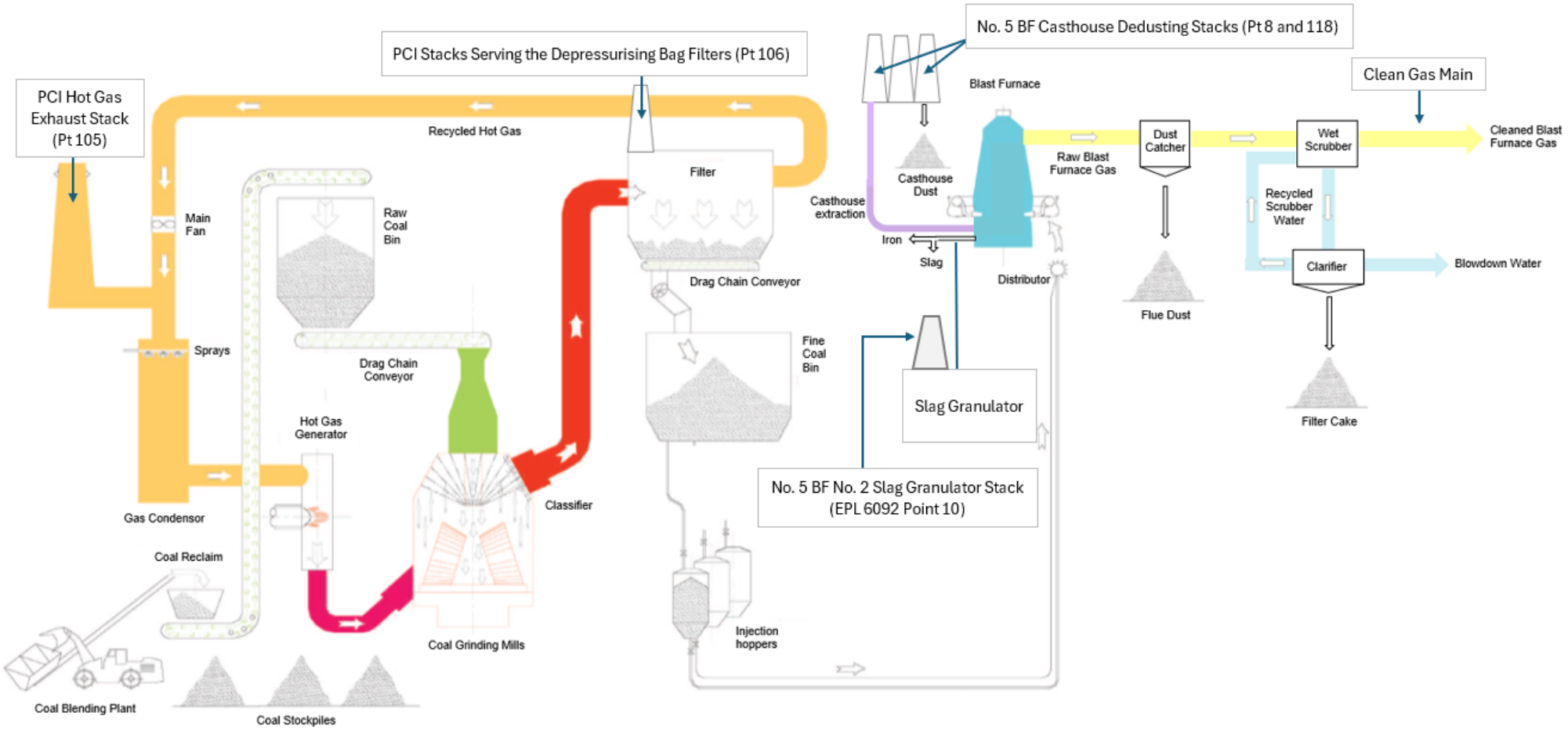

Figure 1: PCI Facility Processes/Output Streams and Sampling Locations (Trial)

3. Trial Plan

A comprehensive trial will be undertaken following approval being granted by the Department of Planning, Housing and Infrastructure (DPHI) to modify the existing development consent for the PCI Plant (DA 154-05-00). The trial is expected to run for approximately 5 to 6 weeks and will be conducted in various stages. The intention of the sampling program will be to account for the distribution of constituents of ACU when added with the PCI feed and to quantify any potential impacts within the ironmaking process (i.e. downstream of the PCI process).

BlueScope will endeavour to conduct the trial when normal operating conditions apply i.e. standard feed rates, hours of operation, raw steel production output, and raw material composition inputs. If in the event that abnormal/unstable conditions arise, the duration of the trial may be extended to ensure that the data obtained through the monitoring program is representative of normal ironmaking processes.

Table 1: Trial Stages

Stage	Duration	Details
Baseline Sampling	2 weeks	Monitoring to be conducted to establish baseline data. Licensed discharge points and process streams to be sampled in the fortnight leading up to the commencement of the trial for ACU addition.
Stage 1	1 week	Commence addition of ACU into the blend at the PCI Plant at a rate of 10 tpd (equivalent to 0.8 % of the total PCI feed rate). During this week, the operators will be able to refine the manual process for adding ACU to the PCI Plant. Hence the reduced initial feed rate of ACU into the plant.
Stage 2	5 weeks	Addition of ACU at the maximum permissible rate of 25 tpd (equivalent to 2% of the PCI feed rate). Wait approximately 3 days to ensue a homogenous mixture is achieved prior to commencing sampling. After 3 days, execute sampling plan for licensed discharge points and waste streams. Repeat sampling to achieve statistical significance for the results obtained.
Stage 3		To commence after typical flue dust tonnage (approx. 1,600 t) has been generated whilst ACU addition is occurring at the PCI plant at the maximum permissible rate. Testing to commence for Sinter Plant stacks approximately 1 week after i.e. testing to start after 1 week of bed consumption begins.

During the trial, the following locations and process streams/outputs will be sampled periodically in accordance with the timeframes specified in Appendix 1. The list of analytes to be sampled has been developed by taking into consideration the following:

- Chemical composition of ACU and PCI;
- Sampling requirements defined within EPL 6092 for licensed discharge points; and
- Resource Recovery Exemption and Order for Blast Furnace Slag.

For licensed discharge points, the sampling locations have already been pre-determined as being the most representative points to sample in accordance with relevant standards/guidelines.

Standard methods will employed which consider a wide variety potential interferences. Having considered the process being sampled, no unusual interferences are expected. Multiple samples (i.e. composite samples) will be taken from each sampling location throughout the course of the trial to improve accuracy and representativeness. Each air quality sampling location will be sampled in duplicate and twice during the duration of the trial, as well as in duplicate initially establish a baseline.

Table 2: Sampling Locations

Sample Point	Location	Justification for Sampling
EPL Pt. 106 – PCI Stacks serving the depressurising bag filters	PCI Facility – licensed discharge point	Potential for accumulation of analytes discharged via direct process related output streams
EPL Pt. 105 - PCI Hot Gas Exhaust Stack	PCI Facility – licensed discharge point	Potential for accumulation of analytes discharged via direct process related output streams
EPL Pt. 118 – No. 5 Blast Furnace Casthouse Dedusting Stacks 1 & 2	No. 5 Blast Furnace – licensed discharge point	Potential for accumulation of analytes discharged via indirect process related output streams
EPL Pt. 10 – No. 5 Blast Furnace Slag Granulator Stack	No. 5 Blast Furnace – licensed discharge point	Potential for accumulation of analytes discharged via indirect process related output streams
EPL Pt. 107 – Sinter Plant Waste Gas Cleaning Plant Stack	Sinter Plant – licensed discharge point	Flue dust, bag house dust is recycled back through the Sinter Plant.
No. 5 Blast Furnace Clean Gas Main (CGM)	No. 5 Blast Furnace overhead gas main sample point	Potential for accumulation of analytes discharged via indirect process related output streams
PCI Cooling Tower Blowdown	PCI Facility	Potential for accumulation of analytes discharged via direct process related output streams
Casthouse Baghouse Dust	No. 5 Blast Furnace	Potential for accumulation of analytes in waste streams
Blast Furnace Fluedust (dustcatcher)	No. 5 Blast Furnace	Potential for accumulation of analytes in waste streams
Blast Furnace Filtercake	No. 5 Blast Furnace	Potential for accumulation of analytes in waste streams
Blast Furnace Slag	No. 5 Blast Furnace slag pits	Potential for accumulation of analytes in by-product
Blast Furnace Iron	No. 5 Blast Furnace iron stream	Potential for accumulation of analytes in product stream
Blast Furnace Clarifier Blowdown	No. 5 Blast Furnace clarifier	Potential for accumulation of analytes discharged via direct process related output streams
ACU generated during the trial	Sinter Plant	Potential for cycling up of analytes in ACU

4. ACU Addition at the PCI Plant

Post trial, all information and findings will be collated into a report which will be provided to both the EPA and DPHI. The report will include reference to the following:

a) confirmation that monitoring results are below licence limits and Health Risk Assessment criteria;

b) a comparison/validation of the proposal predictions against the trial monitoring results or findings for the char composition, waste or output stream composition, mass balance/partitioning modelling assessment, and air emissions modelling;

c) consideration of a mass balance generated from the trial over a defined period of time;

d) an assessment of the fate of dioxins and metals emissions and discharges;

e) an assessment on the possible ‘cycling up’ of pollutants in emissions and discharges to the environment and in other output streams generate through the trial;

f) an assessment of the quantities of ACU used in the trial, second generation ACU produced and other output streams generated;

g) an assessment of the potential changes to waste classification i.e. ACU generated during the trial; and

h) a summary of the cost/benefit analysis for ACU reuse.

APPENDIX 1

Stages of Trial:

Stage	When	Duration	
Baseline		1 week	Baseline monitoring of PCI Plant Area - Occupational Hygenist. Stack + water and solid streams sampling during the ~2 weeks prior to addition of any ACU to process
Stage 1:		7 days	Addition of ACU into blend at 10tpd - Occupational Hygenist to repeat on site monitoring (stage 1) to determine any OHS concerns - duration 1 week
Stage 2:			Addition of ACU at 25tpd (maximium rate to consume arisings and stockpile at 21 Area)
			Wait 3 days to ensure homogenous mixture is completely through to PCSB before commencing monitoring and sampling/testing regime
			Commence sampling at PCI plant at 25tpd
			Commence sampling at BF at 25tpd
			Repeat tests for both PCI Plant and BF to achieve statistical significance on results
Stage 3:			To commence after typical flue dust tonnage (approx. 1600T) generated whilst ACU is included in PCI and has been added to a blended bed. Testing to start after 1 week of bed consumption begins.

						PCI Plant			Blast Furnace									Sinter Plant
Weekday	Stage	Date	Day	ACU Addition (tpd)	Cummulative Addition Tonnes (total)	EPL Pt. 105 - PCI Hot Gas Exhaust Stack	PCI Cooling Tower Blowdown	EPL Pt. 106 – PCI Stacks serving the depressurising bag filters	Pt. 118 – No. 5 Blast Furnace Casthouse Dedusting Stacks 1 & 2	Casthouse Dust	Fluedust (Dustcatcher)	BF Filtercake	Clarifier Blowdown	No. 5 Blast Furnace Clean Gas Main (CGM)	EPL Pt. 10 – No. 5 Blast Furnace Slag Granulator Stack	Blast Furnace Iron	Blast Furnace Slag	EPL Pt. 107 – Sinter Plant Waste Gas Cleaning Plant Stack
Fri	Baseline	TBC		0														
	Baseline			0														
	Baseline			0														
	Baseline			0														
	Baseline			0														
Sat	Stage 1:	TBC	1	10	10													
Sun	Stage 1:		2	10	20													
Mon	Stage 1:		3	10	30													
Tue	Stage 1:		4	10	40													
Wed	Stage 1:		5	10	50													
Thur	Stage 1:		6	10	60													
Fri	Stage 1:		7	10	70													
					70													
Mon	Stage 2:	TBC	8	25	95													
Tue	Stage 2:		9	25	120													
Wed	Stage 2:		10	25	145	✓		✓										
Thur	Stage 2:		11	25	170	✓	✓	✓										
Fri	Stage 2:		12	25	195													
			13	25	220													
			14	25	245													
Mon	Stage 2:	TBC	15	25	270													
Tue	Stage 2:		16	25	295				✓									
Wed	Stage 2:		17	25	320				✓									
Thur	Stage 2:		18	25	345									✓	✓			
Fri	Stage 2:		19	25	370					✓	✓	✓	✓			✓	✓	
			20	25	395													
			21	25	420													
Mon	Stage 2:	TBC	22	25	445													
Tue	Stage 2:		23	25	470									✓	✓			
Wed	Stage 2:		24	25	495	✓		✓										
Thur	Stage 2:		25	25	520	✓	✓	✓										
Fri	Stage 2:		26	25	545													
			27	25	570													
			28	25	595													
Mon	Stage 2:	TBC	29	25	620													
Tue	Stage 2:		30	25	645				✓									
Wed	Stage 2:		31	25	670				✓									
Thur	Stage 2:		32	25	695									✓	✓			
Fri	Stage 2:		33	25	720													
			34	25	745													
			35	25	770													
Mon	Stage 2:	TBC	36	25	795													
Tue	Stage 2:		37	25	820									✓	✓			
Wed	Stage 2:		38	25	845													
Thur	Stage 2:		39	25	870					✓	✓	✓	✓			✓	✓	
Fri	Stage 2:		40	25	895													

Note: Stage 3 testing commences 1 week after a bed containing BF flue dust generated whilst injecting ACU has started to be consumed as feed to the sinter plant

Stage 3:	TBC	TBC														✓
Stage 3:																✓
Stage 3:																✓

PCI Plant			Blast Furnace									Sinter Plant
Hot Gas Exhaust	Depress. Stack	Cooling Tower Blowdown Water	Casthouse Stacks	Casthouse Dust	BFG Clean Gas Main	Flue Dust	BF Filtercake	Clarifier Blowdown	Slag Granulation Stack	Iron	Slag	WGCP Stack
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓		✓		✓				✓			✓
✓												
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓

APPENDIX 2

	(EPL Pt. 105) PCI Hot Gas Exhaust Stack	(EPL Pt. 106) PCI Facility - Stacks serving the depressurising bag filters	(EPL Pt. 118) No. 5 Blast Furnace Casthouse Dedusting Stacks 1 & 2	(EPL Pt. 10) No. 5 Blast Furnace - No. 2 Slag Granulator Stack	(EPL Pt. 107) Sinter Plant Waste Gas Cleaning Plant Stack	No. 5 Blast Furnace Clean Gas Main (CGM)	PCI Cooling Tower Blowdown	Casthouse Bahouse Dust	Blast Furnace Fluedust	Blast Furnace Filtercake	Blast Furnace Slag	Blast Furnace Iron	Blast Furnace Clarifier Blowdown
Aluminium	x	x	x	x	x	x	x	x	x	x	x	x	x
Antimony	x	x	x	x	x	x	x	x	x	x	x	x	x
Arsenic	x	x	x	x	x	x	x	x	x	x	x	x	x
Barium	x	x	x	x	x	x	x	x	x	x	x	x	x
Beryllium	x	x	x	x	x	x	x	x	x	x	x	x	x
Bismuth	x	x	x	x	x	x	x	x	x	x	x	x	x
Boron	x	x	x	x	x	x	x	x	x	x	x	x	x
Boron	x	x	x	x	x	x	x	x	x	x	x	x	x
Cadmium	x	x	x	x	x	x	x	x	x	x	x	x	x
Calcium	x	x	x	x	x	x	x	x	x	x	x	x	x
Carbon													
Cadmium	x	x	x	x	x	x	x	x	x	x	x	x	x
Chromium	x	x	x	x	x	x	x	x	x	x	x	x	x
Cobalt	x	x	x	x	x	x	x	x	x	x	x	x	x
Copper	x	x	x	x	x	x	x	x	x	x	x	x	x
Dioxins & Furans	x	x	x	x	x	x	x	x	x	x	x	x	x
Fine Particles					x								
Fluoride													
Iron	x	x	x	x	x	x	x	x	x	x	x	x	x
Lead	x	x	x	x	x	x	x	x	x	x	x	x	x
Magnesium	x	x	x	x	x	x	x	x	x	x	x	x	x
Manganese	x	x	x	x	x	x	x	x	x	x	x	x	x
Mercury	x	x	x	x	x	x	x	x	x	x	x	x	x
Molybdenum	x	x	x	x	x	x	x	x	x	x	x	x	x
Nickel	x	x	x	x	x	x	x	x	x	x	x	x	x
Nitrogen Oxides	x				x								
Phosphorus	x	x	x	x	x	x	x	x	x	x	x	x	x
Potassium	x	x	x	x	x	x	x	x	x	x	x	x	x
Selenium	x	x	x	x	x	x	x	x	x	x	x	x	x
Silicon	x	x	x	x	x	x	x	x	x	x	x	x	x
Silver	x	x	x	x	x	x	x	x	x	x	x	x	x
Sodium	x	x	x	x	x	x	x	x	x	x	x	x	x
Solid Particles	x	x	x		x								
Sulfuric acid mist and Silfur Trioxide					x								
Sulphur Dioxide					x								
Tin	x	x	x	x	x	x	x	x	x	x	x	x	x
Titanium	x	x	x	x	x	x	x	x	x	x	x	x	x
Total Sulphur													
Vanadium	x	x	x	x	x	x	x	x	x	x	x	x	x
Zinc	x	x	x	x	x	x	x	x	x	x	x	x	x

Appendix B. SDS for Activated Char Undersize

SAFETY DATA SHEET

SPENT ADSORBER CHAR / DUST

Infosafe No.: ACORZ
ISSUED Date : 14/01/2022
ISSUED by: BLUESCOPE STEEL (AIS) PTY LTD

Section 1 - Identification

Chemical Product and Company Identification
Approval No: 138

Product Identifier
SPENT ADSORBER CHAR / DUST

Product Code
4188

Company Name
BLUESCOPE STEEL (AIS) PTY LTD (ABN 19 000 019 625)

Address
Five Islands Road Port Kembla
NSW 2505 AUSTRALIA

Telephone/Fax Number
Tel: 02 4275 7522 (24/7 switch board)
Fax: 02 4275 7159

Emergency Phone Number
131126 Poison Info

Recommended use of the chemical and restrictions on use
Activated char is used in the Sinter Machine Waste Gas Cleaning Plant. It filters dust from the waste gas and also adsorbs sulphur oxides and organic molecules. This material is regenerated to remove/destroy the sulphur oxides and organic molecules and then screened to remove the collected dust prior to reuse. The dust screened from the char is known as Spent Adsorber Char and is stockpiled for recycling.

Section 2 - Hazard(s) Identification

GHS classification of the substance/mixture
Classified as Hazardous according to the Globally Harmonised System of Classification and labelling of Chemicals (GHS) including Work, Health and Safety regulations, Australia.
Not classified as Dangerous Goods according to the Australian Code for the Transport of Dangerous Goods by Road and Rail. (7th edition)
Eye damage/irritation: Category 1
Specific target organ toxicity (repeated exposure): Category 2

Signal Word (s)
DANGER

Hazard Statement (s)
H318 Causes serious eye damage.
H373 May cause damage to organs
by inhalation through prolonged or repeated exposure.

Pictogram (s)
Corrosion,Health hazard

Precautionary Statement – Prevention
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

Precautionary Statement – Response
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.

Precautionary Statement – Disposal
P501 Dispose of contents/container to an approved waste disposal plant.

Section 3 - Composition and Information on Ingredients

Ingredients

Name	CAS	Proportion
Carbon black	1333- 86- 4	30- 60 %
Sulfate	14808- 79- 8	1- 10 %
Potassium chloride	7447- 40- 7	1- 10 %
Iron oxide fume (Fe2O3) , (as Fe)	1309- 37- 1	<10 %
Aluminium oxide	1344- 28- 1	<5 %
Calcium oxide .	1305- 78- 8	<5 %
Titanium oxide	13463- 67- 7	<1 %
Lead		Trace
Arsenic		Trace
Chromium		Trace
Thallium		Trace
Selenium		Trace
Mercury		Trace
Fluorides (as F)		Trace
Cadmium and/or cadmium compounds		Trace
Barium		Trace
Ingredients determined not to be hazardous		Balance

Information on Composition
This product may contain trace amounts of the following elements: Lead, silver, arsenic, barium, beryllium, cobalt, chromium, copper, magnesium, manganese, molybdenum, nickel, phosphorus, antimony, thallium, vanadium and zinc.
Leachate may contain trace amounts of the following elements: Lead, nickel, selenium, cadmium, arsenic, mercury and fluoride.

Section 4 - First Aid Measures

Inhalation
If inhaled, remove affected person from contaminated area. Keep at rest until recovered. If symptoms develop and/or persist seek medical attention.

Ingestion
Do not induce vomiting. Wash out mouth thoroughly with water. Seek immediate medical attention.

Skin
Remove all contaminated clothing immediately. Wash affected area thoroughly with soap and water. Wash contaminated clothing before reuse or discard. Seek medical attention.

Eye
If in eyes, hold eyelids apart and flush the eyes continuously with running water. Remove contact lenses. Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. Seek immediate medical attention.

First Aid Facilities
Eyewash, safety shower and normal washroom facilities.

Advice to Doctor
Treat symptomatically.

Other Information
For advice in an emergency, contact a Poisons Information Centre (Phone Australia 131 126) or a doctor at once.

Section 5 - Firefighting Measures

Suitable Extinguishing Media
Water spray or fog, foam, carbon dioxide or dry chemical powder.

Hazards from Combustion Products
Under fire conditions this product may emit toxic and/or irritating fumes, smoke and gases including carbon monoxide, carbon dioxide and oxides of nitrogen.

Specific hazards arising from the chemical
Combustible solid; will readily burn under fire conditions. The finely divided dust, in sufficient quantity, may form flammable/explosive mixtures with air. Dust clouds may present an explosion hazard in the presence of an ignition source.

Decomposition Temperature
Not available

Precautions in connection with Fire
Fire fighters should wear Self-Contained Breathing Apparatus (SCBA) operated in positive pressure mode and full protective clothing to prevent exposure to vapours or fumes. Water spray may be used to cool down heat-exposed containers. Fight fire from safe location. This product should be prevented from entering drains and watercourses.

Section 6 - Accidental Release Measures

Emergency Procedures
Remove all sources of ignition. Increase ventilation. Evacuate all unprotected personnel. Do not breathe dust. Wear respiratory protection and full protective clothing to minimise exposure. Sweep up material avoiding dust generation - dampen spilled material with water if suitable to avoid airborne dust, OR where possible use dustless methods such as vacuum to collect the material; then transfer material in to suitable vapour tight labelled containers for subsequent recycling or disposal. Dispose of waste according to applicable local and national regulations. If large quantities of this material enter waterways contact the EPA or your local Waste Management Authority.

Section 7 - Handling and Storage

Precautions for Safe Handling
Avoid inhalation of dust, and skin or eye contact. Use only in a well ventilated area. Keep containers sealed when not in use. Prevent the build up of dust in the work atmosphere. Establish good housekeeping practices. Remove dust

accumulations on a regular basis by vacuuming or gentle sweeping to avoid creating dust clouds. Maintain high standards of personal hygiene i.e. washing hands prior to eating, drinking, smoking or using toilet facilities.

Conditions for safe storage, including any incompatibilities

Store in a well ventilated area away from heat and sources of ignition, out of direct sunlight and moisture. Take precautions against static electricity discharges. Use proper grounding procedures. Store away from incompatible materials such as materials that support combustion (oxidising materials). Store in suitable, labelled containers. Inspect periodically for deficiencies such as damage or leaks. Have appropriate fire extinguishers available in and near the storage area. Ensure that storage conditions comply with applicable local and national regulations.
For information on the handling of Combustible dusts and grounding procedure reference should be made to Australian Standard AS/NZS 4745.2004 - 'Code of Practice for Handling Combustible Dusts'.

Section 8 - Exposure Controls and Personal Protection

Occupational exposure limit values

No exposure value assigned for this material by Safe Work, Australia. However, the available exposure limits for ingredients are listed below:
Aluminium oxide
TWA: 10 mg/m³
Calcium oxide
TWA: 2 mg/m³
Carbon black
TWA: 3 mg/m³
Iron oxide fume (as Fe)
TWA: 5 mg/m³
Titanium dioxide
TWA: 10 mg/m³
Lead, inorganic dusts & fumes (as Pb)
TWA: 0.05 mg/m³
NOTE: Carc. 2
Arsenic & soluble compounds (as As)
TWA: 0.05 mg/m³
Note: Carc. 1A
Selenium compounds (as Se)excluding hydrogen selenide
TWA: 0.1 mg/m³
Cadmium and compounds (as Cd)
TWA:0.01 mg/m³
Carc. 1B
Chromium (III) compounds (as Cr)
TWA: 0.5 mg/m³
Chromium (VI) compounds (as Cr), certain water insoluble
TWA: 0.05 mg/m³
NOTE: Carc. 1A, Sen
Chromium (VI) compounds (as Cr), water soluble
TWA: 0.05 mg/m³
NOTE: Sen
Mercury elemental vapour (as Hg)
TWA: 0.003 ppm, 0.025 mg/m³
Fluorides
TWA: 2.5 mg/m³
Thallium, soluble compounds (as Tl)
TWA: 0.1 mg/m³
NOTE: Sk.
Barium, soluble compounds (as Ba)
TWA: 0.5 mg/m³
TWA (Time Weighted Average): The average airborne concentration of a particular substance when calculated over a normal eight-hour working day, for a five-day week.
'Sk' Notice: Absorption through the skin may be a significant source of exposure. The exposure standard is invalidated if such contact should occur.
'Sen' Notice: The substance may cause sensitisation by skin contact or by inhalation.

Carc. 1A: Known to have carcinogenic potential for humans.
Carc. 1B: Presumed to have carcinogenic potential for humans
Carc. 2: Suspected human carcinogen
Source: Safe Work Australia

Biological Monitoring
Lead and Inorganic Compounds
Determinant: Lead
Specimen: Lead in blood
Value: 200 ug/L
Sampling time: Not critical
Notation: -
Note: Persons applying this BEI are encouraged to counsel female workers of child-bearing age about the risk of delivering a child with a PbB over the current CDC reference value. (CDC: Guidelines for the identification and management of lead exposure in pregnant and lactating women, 2010.)
Name: Arsenic, elemental [7440-38-2] and soluble inorganic compounds (excludes gallium arsenide and arsine)
Determinant: Inorganic arsenic plus methylated - metabolites
Specimen: Urine
Value: 35µg As/L
Sampling time: End of workweek
Cadmium and inorganic compounds
Determinant: Cadmium
Specimen: Creatinine in urine
Value: 5 ug/g creatinine
Sampling time: Not critical
Notation: B
Specimen: Creatinine in blood
Value: 5 ug/L
Sampling time: Not critical
Notation: B
Name: FLUORIDES
Specimen: Fluoride in urine
Value: 2 mg/L
Sampling time: Prior to shift
Name: FLUORIDES
Specimen: Fluoride in urine
Value: 3 mg/L
Sampling time: End of shift
Name: CHROMIUM
Specimen: Total chromium in urine
Value: 0.7 µg/mL
Sampling time: End of shift at end of workweek
Name: Mercury, elemental
Determinant: Mercury
Specimen: Creatinine in urine
Value: 20 ug/g
Sampling time: Prior to shift
Source: American Conference of Industrial Hygienists (ACGIH).

Control Banding
Not available

Engineering Controls
This substance is hazardous and should be used with a local exhaust ventilation system, drawing solid/dust away from workers' breathing zone. A flameproof exhaust ventilation system is required. If the engineering controls are not sufficient to maintain concentrations of particulates below the exposure standards, suitable respiratory protection must be worn.

Respiratory Protection
If engineering controls are not effective in controlling airborne exposure then an approved respirator with a replaceable dust/particulate filter should be used. Refer to relevant regulations for further information concerning respiratory protective requirements.

Reference should be made to Australian Standards AS/NZS 1715, Selection, Use and Maintenance of Respiratory Protective Devices; and AS/NZS 1716, Respiratory Protective Devices, in order to make any necessary changes for individual circumstances.

Eye and Face Protection
Safety glasses with full face shield should be used. Eye protection devices should conform to relevant regulations. Eye protection should conform with Australian/New Zealand Standard AS/NZS 1337 (series) - Eye Protectors for Industrial Applications.

Hand Protection
Wear gloves of impervious material. Final choice of appropriate gloves will vary according to individual circumstances. i.e. methods of handling or according to risk assessments undertaken.
Reference should be made to AS/NZS 2161.1: Occupational protective gloves - Selection, use and maintenance.

Thermal Hazards
No further relevant information available.

Body Protection
Suitable protective workwear, e.g. cotton overalls buttoned at neck and wrist is recommended. Chemical resistant apron is recommended where large quantities are handled.

Section 9 - Physical and Chemical Properties

Properties	Description	Properties	Description
Form	Solid	**Appearance**	Dry black particulate solid, ranging in size from a fine dust to cylinders approximately 10 mm long and 5 mm in diameter.
Colour	Black	**Odour**	May smell strongly of sulphur dioxide.
Melting Point	Not available	**Boiling Point**	Not applicable
Decomposition Temperature	Not available	**Solubility in Water**	Partially soluble. Approximately 25% of the material is soluble in water due to the presence of alkali halides.
Specific Gravity	Not available	**pH**	Slurry < 4 (acidic)
Vapour Pressure	Not applicable	**Relative Vapour Density (Air=1)**	Not applicable
Evaporation Rate	Not available	**Odour Threshold**	Not available
Viscosity	Not available	**Partition Coefficient: n-octanol/water (log value)**	Not available
Flash Point	Not applicable	**Flammability**	Combustible solid. Burns strongly when ignited.
Auto-Ignition Temperature	Not available	**Explosion Limit - Upper**	Not available
Explosion Limit - Lower	Not available		

Section 10 - Stability and Reactivity

Chemical Stability
Stable under normal conditions of storage and handling.

Possibility of hazardous reactions
May react with strong acids and bases.

Conditions to Avoid
Dust accumulation, heat and other sources of ignition.

Incompatible Materials
Strong acids and bases.

Hazardous Decomposition Products

Thermal decomposition may result in the release of toxic and/or irritating fumes, smoke and gases including: carbon dioxide and carbon monoxide.

Reactivity and Stability
Reacts with incompatible materials

Hazardous Polymerization
Will not occur.

Section 11 - Toxicological Information

Toxicology Information
No toxicity data available for this material.

Ingestion
Ingestion of this product may irritate the gastric tract causing nausea and vomiting.

Inhalation
Inhalation of dusts may irritate the respiratory system. Chronic exposure to this material may aggravate existing respiratory disorders and lung disorders such as bronchitis, emphysaema and asthma. Onset and progression are related to dust concentrations and duration of exposure.

Skin
Causes mild skin irritation. Skin contact will cause redness, itching and swelling. Repeated exposure may cause skin dryness and cracking and may lead to dermatitis.

Eye
Causes eye damage. Eye contact will cause stinging, blurring, tearing, severe pain and possible burns, necrosis, permanent damage and blindness.

Respiratory Sensitisation
Not expected to be a respiratory sensitiser.

Skin Sensitisation
Not expected to be a skin sensitiser.

Germ Cell Mutagenicity
Not considered to be a mutagenic hazard.

Carcinogenicity
Not considered to be a carcinogenic hazard.
Chromium (VI) compounds, Cadmium and Cadmium compounds & Arsenic and inorganic arsenic compounds are listed as Group 1: Carcinogenic to humans according to International Agency for Research on Cancer (IARC).
Lead compounds,inorganic are listed as a Group 2A: Probably carcinogenic to humans according to International Agency for Research on Cancer (IARC).
Carbon Black, Titanium dioxide, Lead and Antimony trioxide are listed as a Group 2B: Possibly carcinogenic to humans according to International Agency for Research on Cancer (IARC).
Ferric oxide, Chromium(III) compounds, Mercury and inorganic mercury compounds and Selenium and selenium compounds are listed as a Group 3: Not classifiable as to carcinogenicity to humans according to International Agency for Research on Cancer (IARC).

Reproductive Toxicity
Not considered to be toxic to reproduction.

STOT - Single Exposure
Not expected to cause toxicity to a specific target organ.

STOT - Repeated Exposure
May cause damage to organs through prolonged exposure if inhaled.

Aspiration Hazard
Not expected to be an aspiration hazard.

Other Information
Chronic exposure by inhalation may aggravate pre-existing upper respiratory and lung disorders such as bronchitis, emphysema and asthma. Onset and progression are related to dust concentrations and duration of exposure.
Inhalation of iron oxides formed by combustion may lead to ‘metal-fume fever’, a flu-like illness which causes a metallic taste in the mouth, throat irritation and dry cough.

Section 12 - Ecological Information

Ecotoxicity
No ecological data available for this material.

Persistence and degradability
Not available

Mobility
Not available

Bioaccumulative Potential
Not available

Other Adverse Effects
Not available

Environmental Protection
Prevent large quantities of this material entering waterways, drains or sewers.

Hazardous to the Ozone Layer
This product is not expected to deplete the ozone layer.

Section 13 - Disposal Considerations

Disposal Considerations
The disposal of the spilled or waste material must be done in accordance with applicable local and national regulations. To minimise personal exposure to the chemical, refer to Section 8 - Exposure Controls and Personal Protection.

Section 14 - Transport Information

Transport Information
Not classified as Dangerous Goods according to the Australian Code for the Transport of Dangerous Goods by Road and Rail. (7th edition)
Not classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air.
Not classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea.

ADG U.N. Number
None Allocated

ADG Proper Shipping Name
None Allocated

ADG Transport Hazard Class
None Allocated

Special Precautions for User
Not available

IMDG Marine pollutant
No

Transport in Bulk
Not available

Additional Information
As a new product the material is discharge directly from bulkbag directly to the loading hopper. As a dust discharge from the plant it must be wetted through a mixer before being transported by tip truck to a stockpile. When entering the process plant where there is dry dust a P2 mask, disposable overalls and gloves must be worn.
Pickford & Rhyder Consulting performed Bulk fraction quartz analysis by Fourier Transform Infrared (FTIR) Spectroscopy. Certificate number of analysis 50078/79-BQ. Alpha quartz was not detected at the limit of detection of <0.5% w/w. (respirable fraction of dust was not analysed, as bulk quartz was not detected).

Section 15 - Regulatory Information

Regulatory Information

Classified as Hazardous according to the Globally Harmonised System of classification and labelling of chemicals (GHS) including Work, Health and Safety regulations, Australia.
Classified as a Scheduled 7 Poison according to the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).
Schedule 7 Poisons should be available only to specialised or authorised users. Special regulations restricting their availability, possession, storage or use may apply.

Poisons Schedule
S7

Montreal Protocol
Not listed

Stockholm Convention
Not listed

Rotterdam Convention
Not listed

International Convention for the Prevention of Pollution from Ships (MARPOL)
Not available

Agricultural and Veterinary Chemicals Act 1994
Not applicable

Basel Convention
Not available

Section 16 - Any Other Relevant Information

Date of Preparation
SDS Reviewed: January 2022
Supersedes: September 2016
Supersedes: January 2013

Version Number
Version: 3.0

Literature References
Preparation of Safety Data Sheets for Hazardous Chemicals Code of Practice.
Standard for the Uniform Scheduling of Medicines and Poisons.
Australian Code for the Transport of Dangerous Goods by Road & Rail.
Work Health and Safety Regulations, Schedule 10: Prohibited carcinogens, restricted carcinogens and restricted hazardous chemicals.
Code of Practice for Supply Diversion into Illicit Drug Manufacture.
National Code of Practice for Chemicals of Security Concern.
Agricultural Compounds and Veterinary Chemicals Act.
International Agency for Research on Cancer (IARC) Monographs.
Montreal Protocol on Substances that Deplete the Ozone Layer.
Stockholm Convention on Persistent Organic Pollutants (POPs).
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade.
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.
International Air Transport Association (IATA) Dangerous Goods Regulations.
International Maritime Dangerous Goods (IMDG) Code.
Workplace exposure standards for airborne contaminants.
Adopted biological exposure determinants, American Conference of Industrial Hygienists (ACGIH).
Globally Harmonised System of Classification and Labelling of Chemicals (7th revised edition).
Code of Practice: Managing Noise and Preventing Hearing Loss at Work.

User Codes

User Title Label	User Codes
Approval Number	000138

END OF SDS