

BHP STEEL (AIS) PTY. LTD.,
Trading as FLAT PRODUCTS,
ACN/ARBN 000 019 625,
PO BOX 1854,
WOLLONGONG NSW 2500
REGISTERED POST

Attention: Mr. ALAN O'BRIEN

Notice Number 1011573
File Number 280032
Date 19-Oct-2001

NOTICE OF VARIATION OF LICENCE 6092

Section 58 of the Protection of the Environment Operations Act 1997

(APPROVAL FOR ALTERNATIVE STANDARD OF CONCENTRATION FOR HYDROGEN SULFIDE EMISSIONS UNDER CLAUSE 7A OF THE CLEAN AIR (PLANT AND EQUIPMENT) REGULATION 1997

BACKGROUND

- A. BHP STEEL (AIS) PTY. LTD. ("the occupier") occupies premises at Port Kembla Steelworks, Five Islands Road, Cringila NSW 2505 ("the premises"). The occupier carries on scheduled activities at the premises and is the holder of environment protection licence 6092 for Scheduled Activity - Premises Based ("the licence") under the Protection of the Environment Operations Act 1997 ("the POEO Act").
- B. Number Two Blast Furnace slag granulator was operated from September 1989 until the Number Two Blast Furnace shut down in 1996. Number Five Blast Furnace slag granulators (Discharge Point 10, No 2 Slag Granulator Stack and Discharge Point 11, No 1 Slag Granulator Stack on Environment Protection Licence 6092) have been operated since June 1991. Number Two Blast Furnace Slag Granulator was relocated to Number Six Blast Furnace and has been operational at this new location since January 2000 (Discharge Point 104, Number Six Blast Furnace Granulator Stack on Environment Protection Licence 6092). The relocation moved it further from residences, and incorporated engineering improvements.
- C. The occupier carries on the process of granulating slag at the Number Five Blast Furnace slag granulators and at the Number Six Blast Furnace slag granulator ("the processes") at the premises. Hydrogen sulphide is emitted by the processes.
- D. The occupier currently holds exemptions from the hydrogen sulphide emissions limit prescribed by clause 7 of the Clean Air (Plant and Equipment) Regulation 1997 in relation to the Number Five Blast Furnace slag granulator stacks and the Number Six Blast Furnace slag granulator stack. The Number Five Blast Furnace slag granulator exemption from section 15(1) of the Clean Air Act was granted by the Minister for the Environment on 07 June 1993 subject to conditions. The Number Six Blast Furnace slag granulator exemption from compliance with clause 7 of the Clean Air

(Plant and Equipment) Regulation 1997 was granted by the Environment Protection Authority (EPA) with the approval of the Board of the EPA on 20 July 1999 subject to conditions. These exemptions expire on 30 September 2001.

E. Under clause 7A of the Clean Air (Plant and Equipment) Regulation 1997 the EPA may approve a site-specific alternative concentration limit for hydrogen sulphide emissions from premises on which a scheduled activity is carried on. Where such an approval has been granted, the occupier of the premises will be exempted from the concentration limit otherwise applicable under clause 7 of the Clean Air (Plant and Equipment) Regulation 1997. An approval issued under clause 7A may have conditions attached.

F. Before granting an approval under Clause 7A the EPA must: “(a) take into consideration the impact of the approval on local and regional air quality and amenity; and (b) be satisfied that it is not practicable for the occupier to comply with clause 7 by implementing operational changes to plant or practices; and (c) be satisfied that the alternative standard of concentration for hydrogen sulphide emissions has been calculated in accordance with the document entitled *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales*, prepared by the Authority and published in the Gazette, as in force from time to time.” These requirements are specified in subclause 7A (3).

G. The occupier’s representatives and the EPA have been meeting to discuss the information requirements that the occupier must satisfy to make an application for site-specific hydrogen sulphide emissions limits under the terms of clause 7A of the Clean Air (Plant and Equipment) Regulation 1997 and the likely form that any site-specific emission limits would take.

H. On 13 September 2001 the occupier wrote to the EPA applying for an approval for alternative hydrogen sulphide emission limits in relation to the processes under clause 7A of the Clean Air (Plant and Equipment) Regulation. This application provided an impact assessment report for hydrogen sulphide emissions from Number Five and Number Six Blast Furnace Slag Granulators and proposed site- specific stack emission limits. The application included an assessment of impact on local air quality and amenity, the practicality of operational changes, proposed operating limits and a proposed program of actions.

I. The EPA has assessed the information provided by the occupier on 13 September 2001 against the requirements specified in clause 7A(3)(a),(b) and (c). The EPA:

- (i) has taken *“into consideration the impact of the approval on local and regional air quality and amenity”*

To protect human health resulting from workplace exposures to air pollutants, various organisations such as the National Occupational Health and Safety Commission (NOHSC) and American Conference of Governmental Industrial Hygienists (ACGIH) publish Reference Exposure Levels (RELs), Permissible Exposure Limits (PELs) and Threshold Limit Values (TLVs) respectively. RELs, PELs and TLVs are presented as either 8 hour Time Weighted Averages (TWAs) or 15 minute Short Term Exposure Limits (STELs).

The NOHSC TWA and STEL (ACGIH, 1991) for hydrogen sulphide are 10 ppm (14 mg/m³; 10,000 ppb) and 15 ppm (21 mg/m³; 15, 000 ppb) respectively.

The odour threshold for hydrogen sulphide is 0.69 µg/m³ (0.45 ppb) (AWT, 2001). Based on the NOHSC TWA for hydrogen sulphide, the difference between health effects and odour threshold would be of the order of 22,200 times (10,000 ppb/0.45 ppb). The EPA has developed ground-level concentration (glc) criteria (NSW EPA, 2001) for hydrogen sulphide based on the work carried out by AWT, 2001. The objective of the glc criteria is to ensure offensive odour impacts will not occur. Since the threshold for health effects is much higher than for odour detection, compliance with the glc criteria should ensure that there will be no adverse impacts on health, local and regional air quality and amenity.

American Conference of Governmental Industrial Hygienists (ACGIH), 1991, *Documentation of Threshold Limit Values and Biological Exposure Indices, 6th Edition*, ACGIH, Cincinnati, Ohio.

AWT, 2001, *Literature Review—Australian and Overseas Odour Threshold Data and Ambient Air Quality Criteria for Hydrogen Sulphide, A Report to the NSW EPA*. Australian Water Technologies, Sydney.

NSW EPA, 2001, *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales*.

(ii) is "satisfied that it is not practicable for the occupier to comply with clause 7 by implementing operational changes to plant or practices".

In 1997 the occupier was required to investigate options and their costs to reduce the level of hydrogen sulphide in emissions from the Number Five Blast Furnace slag granulator stack. The occupier reported to the EPA in December 1998.

In this report the occupier looked at eight different options including: (i) cold water granulation cooling towers; (ii) cold water granulation heat exchangers; (iii) cold water granulation cooling ponds; (iv) cold water granulation and stack condensation; (v) salt water granulation; (vi) salt water stack condensation; and (vii) chemical treatment. The report also looked at the costs and limitations of these options.

The occupier reported that cold water granulation and stack condensation using fresh water and cooling towers was the most common system used overseas to reduce hydrogen sulphide emissions. The occupier reported that this system would have an estimated cost of \$15 million and would incur operating costs of \$600,000 pa. The occupier went on to report that due to the limited impact of hydrogen sulphide and offensive odours from slag granulation, the \$15 million installation was not justified, and that the capital resources could be better spent on other Pollution Reduction Programs. The occupier also reported that this decision would be revisited if the hydrogen sulphide levels in the community became a concern.

In their letter to the EPA on 13 September 2001 the occupier reported that since 1998 public complaints due to hydrogen sulphide had reduced from 7 in 1998, to 3 in 2000, to 0 in year 2001 up to July. The occupier also went onto say that the "operation of the slag granulators maximises slag reuse and minimises overall impact from emissions and slag disposal". The occupier also revisited the 1998 report detailed above and stated the cold water granulation and stack condensation is the most environmentally acceptable, however from operations in Germany and Taiwan there are doubts as to whether this technology would meet the requirements of clause 7 of the Clean Air (Plant and Equipment) Regulation (1997). The occupier also stated that while it is physically possible to install this technology at the Number 6 Blast Furnace slag granulator due to the granulator being physically separate from the Furnace, this was not the case at Number 5 Blast Furnace and the installation of this technology would be more difficult.

The occupier stated the installation of this technology would cost \$35 million to \$40 million, and with the installation difficulties, would be impracticable.

The EPA has reviewed the relevant information and does not believe that at this time it is practicable for the occupier to comply with clause 7 of the Clean Air (Plant and Equipment) Regulation. This approval will however be conditioned to require the occupier to complete a number of Pollution Reduction Programs (PRPs). The PRPs will require the occupier to investigate available Cleaner Production Techniques and their costs to reduce the levels of hydrogen sulphide from the Number Five and Number Six Blast Furnace slag granulators, and report this information in writing to the EPA. This approval will require the investigation of continuous hydrogen sulphide monitoring.

It is important to note that this approval does not authorise an increase in the environmental impact of the operation of the slag granulators. The slag granulators will be operated in the same manner as they are currently operated.

(iii) is "satisfied that the alternative standard of concentration for hydrogen sulphide emissions has been calculated in accordance with the document entitled 'Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales' prepared by the Authority and published in the Gazette, as in force from time to time"

The EPA carried out a detailed assessment of the information provided by the occupier on 13 September 2001. In carrying out this assessment the EPA has looked at the following: 1) Impact assessment criteria; 2) Emissions data; 3) Background concentrations; 4) Meteorological data; 5) Peak to mean ratios; 6) Dispersion model; 7) Exhaust temperature; and 8) Hydroxyl radical formation. From this assessment the EPA is satisfied that the alternative standard of concentration for hydrogen sulphide emissions has been calculated in accordance with the 'Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales'.

1) By this notice the EPA varies licence 6092 as set out in the Appendix. *(for licences with a lot of changes and where the whole licence document will be in the appendix: The Appendix is a copy of the licence marked with the variations that are made to it by this notice. (for licences with a small number of changes where only the conditions will be printed: The Appendix is a copy of the provisions of the licence which are varied by this notice, marked with the variations that are made to them.*

- The variations to the licence are shown as Special Conditions: Condition E2.

2) The variations to the licence are indicated in the following way:

- if a strike through mark appears through any word or other text (eg. **Solids or**) this indicates that the word or other text is deleted from the licence by this notice; and
- if a double underline appears under any word or other text (eg. **must be treated**) this indicates that the word or other text is added to the licence by this notice.

3) Except, as provided by s84(2) of the POEO Act, the variations to the licence by this notice begin to operate at the expiry of the period of 21 days from when you get notice of the variations, unless another date is specified in this notice.

Note: Section 84(2) provides that a variation to a licence does not operate until

- the expiry of the period of 21 days after notice of the decision to vary the licence is given to the licensee, or
- if an appeal against the decision is lodged, until the Land and Environment Court determines the appeal, or
- the licensee notifies the EPA in writing that no appeal is to be made against the decision to vary the licence,

whichever first occurs.

(This notice is issued under section 58(5) of the Protection of the Environment Operations Act 1997.)

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 Mr William Dove
 Acting Head Regional Operations Unit
 South Coast
 (by Delegation)

INFORMATION ABOUT THIS NOTICE:

- Section 287 of the Act enables appeals to be made in connection with decisions about a licence application within 21 days after notice of the decision is given to the applicant.

SPECIAL CONDITIONS

E2 Notice 1011573

/A

: Approval for Alternative Standard of Concentration for Hydrogen Sulphide Emissions under Clause 7A of the Clean Air (Plant and Equipment) Regulation 1997

1)

This approval applies from 27 September 2001 (see approval letter of 27 September 2001).

Note: This approval may be amended or revoked by the EPA by means of a written notice given to the occupier.

Provided that the occupier complies with the conditions of this approval, the occupier is exempt from the hydrogen sulphide emissions limit prescribed by clause 7 of the Clean Air (Plant and Equipment) Regulation 1997 in relation to the processes.

Failure to comply with the terms of this approval may constitute an offence, including against section 128 of the Protection of the Environment Operations Act 1997. Maximum penalty for an offence against section 128:

a)

in the case of a corporation - \$250,000 with, in the case of a continuing offence, a further penalty not exceeding \$120,000 for each day the offence continues; or

b)

in the case of an individual - \$120,000 with, in the case of a continuing offence, a further penalty not exceeding \$60,000 for each day the offence continues.

2)

For the purposes of this approval:

"CEM-", together with a number, means a continuous emission monitoring system protocol of that number as referred to in the document entitled *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* prepared by the EPA and published in the NSW Government Gazette, as in force from time to time.

"TM-", together with a number, means a test method of that number as referred to in the document entitled *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* prepared by the EPA and published in the NSW Government Gazette, as in force from time to time.

LIMIT CONDITIONS

L Mass rate limits

L1 For each monitoring/discharge point or utilisation area specified in the tables below (by point number), the mass rate of a pollutant discharged at that point, must not exceed the mass rate limits specified for that pollutant in the table.

EPA Identification point	Pollutant	Units of measure	100 % limit	Averaging period
Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Hydrogen Sulphide	g/s	1.2	Block 1-hour average
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Hydrogen Sulphide	g/s	1.2	Block 1-hour average

EPA Identification point	Pollutant	Units of measure	100 % limit	Averaging period

Discharge Point 104, No 6 Blast Furnace Slag Granulator	Hydrogen Sulphide	g/s	0.75	Block 1-hour average
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OPERATING CONDITIONS

O Number Five Blast Furnace Slag Granulators

O1 The occupier must not granulate slag in the Number Five Blast Furnace Slag Granulators for more than 5,256 hours in any 12 month period. This restriction in operating time relates directly to the hydrogen sulphide mass rate limit of 1.2 g/s. Should the occupier wish to be able to granulate slag in the Number Five Blast Furnace Slag Granulators in excess of 5,256 hours in any 12 month period, a new application for a new mass rate limit for hydrogen sulphide must be submitted.

O Number Six Blast Furnace Slag Granulator

O2 The occupier must not granulate slag in the Number Six Blast Furnace Slag Granulator for more than 2,628 hours in any 12 month period. This restriction in operating time relates directly to the hydrogen sulphide mass rate limit of 0.75 g/s. Should the occupier wish to be able to granulate slag in the Number Six Blast Furnace Slag Granulator in excess of 2,628 hours in any 12 month period, a new application for a new mass rate limit for hydrogen sulphide must be submitted.

MONITORING AND RECORDING CONDITIONS

M Requirement to monitor mass rate of pollutant discharge

M1 For each monitoring/discharge point specified below (by point number), the occupier must monitor (by sampling and obtaining results by analysis) the mass rate of discharge of each pollutant and parameter specified. The occupier must use the sampling method, units of measure and sample at the frequency, specified opposite in the other columns:

EPA Identification point	Pollutant	Units of measure	Method	Frequency
Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Hydrogen Sulphide	g/s	TM-5	quarterly
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Hydrogen Sulphide	g/s	TM-5	quarterly

EPA Identification point	Pollutant	Units of measure	Method	Frequency
Discharge Point 104, No 6 Blast Furnace Slag Granulator	Hydrogen Sulphide	g/s	TM-5	quarterly

EPA Identification Point	Parameter	Units of measure	Method	Frequency
Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Velocity	m/s	TM-2	quarterly
Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Volumetric flow rate	m ³ /s	TM-2	quarterly
Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Temperature	K	TM-2	quarterly
Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Moisture	%	TM-22	quarterly
Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Dry gas density of stack gases	kg/m ³	TM-23	quarterly
Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Molecular weight of stack gases	g/g.mole	TM-23	quarterly

EPA Identification Point	Parameter	Units of measure	Method	Frequency
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Velocity	m/s	TM-2	quarterly
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Volumetric flow rate	m ³ /s	TM-2	quarterly
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Temperature	K	TM-2	quarterly
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Moisture	%	TM-22	quarterly
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Dry gas density of stack gases	kg/m ³	TM-23	quarterly
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Molecular weight of stack gases	g/g.mole	TM-23	quarterly

EPA Identification Point	Parameter	Units of measure	Method	Frequency
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Discharge Point 104, No 6 Blast Furnace Slag Granulator	Velocity	m/s	TM-2	quarterly
Discharge Point 104, No 6 Blast Furnace Slag Granulator	Volumetric flow rate	m ³ /s	TM-2	quarterly
Discharge Point 104, No 6 Blast Furnace Slag Granulator	Temperature	K	TM-2	quarterly
Discharge Point 104, No 6 Blast Furnace Slag Granulator	Moisture	%	TM-22	quarterly
Discharge Point 104, No 6 Blast Furnace Slag Granulator	Dry gas density of stack gases	kg/m ³	TM-23	quarterly
Discharge Point 104, No 6 Blast Furnace Slag Granulator	Molecular weight of stack gases	g/g.mole	TM-23	quarterly

EPA Identification Point	Other	Units of measure	Method	Frequency
Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Selection of sampling positions	-	TM-1	-
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Selection of sampling positions	-	TM-1	-

EPA Identification Point	Other	Units of measure	Method	Frequency
Discharge Point 104, No 6 Blast Furnace Slag Granulator	Selection of sampling positions	-	TM-1	-

Note: Based on monitoring results obtained, the EPA may review monitoring frequency.

M Requirement to monitor hours of operation of slag granulators

M2 The occupier must monitor the total number of hours during which slag is granulated in Number Five Blast Furnace Slag Granulators.

M3 The occupier must monitor the number of hours during which slag is granulated in Number Six Blast Furnace Slag Granulator.

REPORTING CONDITIONS

R Reporting of Monitoring Results

R1 The results of all monitoring required by this approval must be reported to the EPA. The results must be compiled in a bound report for each 12-month period, or other period as agreed to by the EPA, and contain all results and details of any non-compliances with the conditions of this approval (including reasons for such non-compliance), together with actions taken to prevent a recurrence of any non-compliance. Two copies of the bound report must be submitted to the EPA within sixty days of the end of each 12-month period or other period as agreed to by the EPA. Where possible the results of any monitoring data must also be reported graphically and supplied to the EPA on disk in an agreed software. This report may be published by the EPA for distribution to the public.

POLLUTION STUDIES AND REDUCTION PROGRAMS

U1 PRP Prepare a report on cleaner production techniques

The occupier must investigate the options available and their costs to reduce the levels of hydrogen sulphide in emissions from the Number Five Blast Furnace Slag Granulators and the Number Six Blast Furnace Slag Granulator. The occupier must provide a written report to the EPA detailing the cost and environmental effectiveness of the different options available for hydrogen sulphide reduction. In addition this report must recommend the most appropriate hydrogen sulphide control strategy to achieve the following hydrogen sulphide mass emission limits:-

(a)

Number Five Blast Furnace Slag Granulators (discharge points 10 and 11) – 0.2 g/s. This stack emission rate relates to a hydrogen sulphide ground level concentration of $1.38 \mu\text{g}/\text{m}^3$ (nose response time average, 99th percentile) with the slag granulator operating 100% of available operating hours.

(b)

Number Six Blast Furnace Slag Granulator (discharge point 104) – 0.2 g/s. This stack emission rate relates to a hydrogen sulphide ground level concentration of $1.38 \mu\text{g}/\text{m}^3$ (nose response time average, 99th percentile) with the slag granulator operating 100% of available operating hours.

Completion date: 1 October 2003.

U2 PRP Continuous monitoring of hydrogen sulphide emissions

The purpose of this Pollution Reduction Program is for the occupier to investigate the practicability of installing and operating continuous emissions monitoring equipment as specified in the following tables.

The occupier must investigate the practicability of installing and operating the continuous emissions monitoring equipment which would be required by the monitoring specified in the table below.

If the investigation concludes that continuous emissions monitoring is not practicable an alternative monitoring program must be recommended.

An interim report must be provided to the EPA in writing by 31 December 2001, with the final report being provided to the EPA in writing by 31 March 2002.

Following the EPA review of these reports the occupier must, by 1 October 2002 implement the monitoring program required by the EPA in writing.

EPA Identification point	Pollutant	Units of measure	Method	Frequency
Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Hydrogen Sulphide g/s	CEM-7	continuous	
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Hydrogen Sulphide g/s	CEM-7	continuous	

EPA Identification point	Pollutant	Units of measure	Method	Frequency
Discharge Point 104, No 6 Blast Furnace Slag Granulator	Hydrogen Sulphide g/s	CEM-7	continuous	

EPA Identification Point	Parameter	Units of measure	Method	Frequency
Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Velocity	m/s	CEM-6	continuous
Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Volumetric flow rate	m ³ /s	CEM-6	continuous

Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Temperature	K	TM-2	continuous
Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Moisture	%	TM-22	continuous

EPA Identification Point	Parameter	Units of measure	Method	Frequency
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Velocity	m/s	CEM-6	continuous
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Volumetric flow rate	m ³ /s	CEM-6	continuous
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Temperature	K	TM-2	continuous
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Moisture	%	TM-22	continuous

EPA Identification Point	Parameter	Units of measure	Method	Frequency
Discharge Point 104, No 6 Blast Furnace Slag Granulator	Velocity	m/s	CEM-6	continuous
Discharge Point 104, No 6 Blast Furnace Slag Granulator	Volumetric flow rate	m ³ /s	CEM-6	continuous
Discharge Point 104, No 6 Blast Furnace Slag Granulator	Temperature	K	TM-2	continuous
Discharge Point 104, No 6 Blast Furnace Slag Granulator	Moisture	%	TM-22	continuous

EPA Identification Point	Other	Units of measure	Method	Frequency
Discharge Point 10, No 5 Blast Furnace, No 2 Slag Granulator	Selection of sampling positions	-	TM-1	-
Discharge Point 11, No 5 Blast Furnace, No 1 Slag Granulator	Selection of sampling positions	-	TM-1	-

EPA Identification Point	Other	Units of measure	Method	Frequency
Discharge Point 104, No 6 Blast Furnace Slag Granulator	Selection of sampling positions	-	TM-1	-

Note: Following the completion of the PRPs required by this approval, the EPA will review whether BHP has complied with the environmental objectives and conditions that form the basis of this approval. Following this review the EPA may consider whether the approval should continue in its current form.