DRAFT ENVIRONMENTAL PROTECTION POLICY FOR THE CONTROL OF SULPHUR DIOXIDE IN THE AIR ENVIRONMENT OF THE KALGOORLIE-BOULDER RESIDENTIAL AREAS

REPORT TO THE MINISTER FOR ENVIRONMENT

Environmental Protection Authority
Perth, Western Australia
Bulletin 315 December 1987

DRAFT ENVIRONMENTAL PROTECTION POLICY FOR THE CONTROL OF SULPHUR DIOXIDE IN THE AIR ENVIRONMENT OF THE KALGOORLIE-BOULDER RESIDENTIAL AREAS

REPORT TO THE MINISTER FOR ENVIRONMENT

Environmental Protection Authority
Perth, Western Australia

Bulletin 315 December 1987

ISSN 1030-0120

ISBN 0 7309 1694 4

CONTENTS

APPENDICES

TABLE

1. INTRODUCTION

Since 1980, gold mining and processing industries in the Kalgoorlie-Boulder area have been operating pyrite roasters to extract gold from sulphide-based ores. These roasters oxidise the sulphide ore, producing large amounts of sulphur dioxide gas which is released from chimneys into the surrounding air. Sulphur dioxide is also released from the nickel smelter situated south of the Kalgoorlie-Boulder townships.

In 1982 a Task Force was established to investigate the extent of sulphur dioxide pollution and to make recommendations to the then Air Pollution Control Council on appropriate measures for controlling this pollution. The Task Force submitted its final report to the Minister for Environment in September 1987, and the report has subsequently been released to the public. The report provides a detailed discussion on the historical and technical aspects of the sulphur dioxide problem in the Kalgoorlie-Boulder area; such information is not repeated here.

In order to address the sulphur dioxide pollution problem and provide an enforceable control mechanism which is appropriate in the context of community dependence on mineral processing for its economic existence, the Environmental Protection Authority has proceeded to develop a draft environmental protection policy entitled "DRAFT ENVIRONMENTAL PROTECTION POLICY FOR THE CONTROL OF SULPHUR DIOXIDE IN THE AIR ENVIRONMENT OF THE KALGOORLIE-BOULDER RESIDENTIAL AREAS". The initial draft policy was released for public review on 14 August 1987 with an invitation to interested persons and organisations to submit comments to the Authority by 18 September 1987. A public meeting attended by the Authority Chairman was held in Kalgoorlie on 10 September 1987, for the purpose of informing interested persons about the draft policy and providing them an opportunity to put forward their views. Subsequent to the close of the period for public comments, the draft policy has been reviewed and revised in the light of comment received.

This report accompanies the submission of the draft policy to the Minister for Environment in accordance with Section 28 of the Environmental Protection Act, 1986.

2. OVERVIEW OF THE DRAFT POLICY

The draft policy, a copy of which appears in Appendix A, is self contained and self explanatory, and should be read in conjunction with this report. In outline, the draft policy:

- defines the area to be covered by the policy;
- establishes the beneficial uses to be protected within the policy area;
- establishes the air quality objectives for sulphur dioxide from existing sources;
- notes that future sources would be expected to meet more stringent controls than those established in this policy and will be assessed by the Authority under Part IV of the Act.
- explains the means of achieving the objectives of the policy, via licence provisions of the Environmental Protection Act, 1986; and
- describes circumstances under which the policy will or may be reviewed.

3. OVERVIEW OF PUBLIC COMMENTS ON THE DRAFT POLICY

Twenty two written submissions were received from interested individuals and organisations during the period set for public comment on the policy. A list of persons or organisations making submissions appears in Appendix B.

The submissions were analysed to extract the main issues, which are listed in Table 1 in appropriate groupings. The distribution of comments across the twenty two submissions, denoted (a) to (v), is shown in the matrix. Points raised at the public meeting of 10 September 1987 are also listed. Comments and queries relating to the specifics of licence conditions in Schedule C of the draft policy have not been included in Table 1.

The issues in Table 1 will not be treated individually but are covered as far as is possible within the discussion in the next section. An overview of proposed licence conditions is also provided.

4. REVIEW OF THE DRAFT POLICY

4.1 EXISTING SOURCES

The Authority's proposal to establish an environmental protection policy arose in response to the agreements reached at a meeting on 1 April 1987 between Government Ministers, representatives from the gold industries at Kalgoorlie and representatives from the EPA and other Government Departments. At that meeting, Government Ministers clearly stated that levels of sulphur dioxide in the Kalgoorlie-Boulder areas had been unacceptable on many occasions and that an enforceable system of control measures was required.

The ambient air quality objectives will be discussed in some detail in the next section. The Authority is satisfied that the proposed degree of protection is appropriate in the context of existing industries which are of crucial importance to the Goldfields Region. However, the Authority is also strongly committed to seeking improvements in the air quality at Kalgoorlie, as and when opportunities arise. This involves seeking to minimise any further degradation of air quality due to the operations of any future industrial developments and the encouragement of any future initiatives to reduce the existing emissions of sulphur dioxide in the vicinity of the policy area.

4.2 NEW SOURCES

The only reference in the draft policy to possible new sources of sulphur dioxide in and around the policy area is in Clause 4, which states:

> "The purpose of this policy is to establish ambient air quality objectives for sulphur dioxide emitted by existing sources in and around the policy area; new sources of sulphur dioxide are not covered by this policy but will be assessed by the Authority under Part IV of the Act and will be expected to meet more stringent controls on sulphur dioxide impact.

The draft policy is clearly tailored to address the sulphur dioxide pollution problem caused by existing sources adjacent to the policy area. The second beneficial use proclaimed under Clause 6 relates explicitly to the continued operation of these existing industries. The Authority expects

TABLE 1 LIST OF ISSUES RELATED TO SUBMISSIONS

	SUBMISSIONS																							
1 POLICY TOO LENIENT	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	public meeting
1.1 2000ug/m3 too high for 1-hour				*		*	*	*	*				*		*	*			*				*
1.2 1300ug/m3 too high for 3-hour																			*				
1.3 365ug/m3 too high for 24-hour																*							
1.4 short-term peak concentrations are the main problem (ie 10-minute concentrations)	*					*									*	*			*				*
1.5 2000ug/m3 objective will not significantly improve the air quality															*								*
1.6 current asthma, discomfort, long term health fears								*			*					*							
1.7 no exceedences of 2000ug/m3 should be allowed															*				*				
2 POLICY TOO SEVERE	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	public meeting
2.1 a 1-hour objective is not appropriate for a mining town c.f. Mt Isa														*					*	*			
2.2 1-hour control can not be achieved by roasters																			*				
2.3 a 1-hour objective should be deferred to 1.7.88 pending control strategy testing														*					*	*			
2.4 should have exceedence allowances on objectives														*					*				
2.5 annual objective should be 80ug/m3														*					*				
3 POLICY IS APPROPRIATE	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	public meeting
3.1 SO2 objectives are realistic																						*	
3.2 no delay in implementing objectives in view of April 85 strategy start															*								
3.3 policy review mechanism supported																						*	
4 POLICY AREA SHOULD BE EXTENDED TO INCLUDE	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	public meeting
4.1 Coolgardie										*			*		*				*				
4.2 Parkeston															*		*		*				
4.3 Williamstown															*				*				
4.4 Trafalgar															*				*				
4.5 Kambalda															*				*				
4.6 Kalgoorlie Aboriginal Reserve																	*						
4.7 Wider area for flora and fauna																			*				
5 POLICY AREA SHOULD BE REDEFINED	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	public meeting
5.1 policy area geometric shape is somewhat arbitary particularly S.W. corner																				*			
6 OTHER SUGGESTED CHANGES TO POLICY	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	public meeting
6.1 policy should specify penalties	*																						
6.2 means of identifing offending industry required	*																						*
6.3 effects on flora and fauna should be considered			*																*				
6.4 monitoring results should be released to the public monthly											*				*				*				*
6.5 each licensee should be allowed 3 exceedences under clause 9														*						*	*		
6.6 100 percent monitoring data recovery necessary															*								
6.7 policy should specify the required number of monitoring stations to provide statistically adequate sampling																*							
6.8 arsenic, tellerium and antimony should be covered		*													*								*
6.9 monitor should be required at major schools																*							
6.10 important meteorolical parameters should be specified																*							
7 OTHER ISSUES	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	public meeting
7.1 alternative gold recovery processes with less pollution		*									*												
7.2 shift airport and increase stack height					*																		
7.3 NATA registration for licensees											*												
7.4 EPA should exert pressure for emission reduction in future											*												
7.5 other sources of SO2 in area														*							*		
7.6 relocation of roasters															*								
7.7 retrofitting of scrubbers to stacks															*								
7.8 retrofitting of stack monitors															*								
7.9 EPA should publish criteria for review of policy																			*				
7.10 air at Kalgoorlie is far better than in previous decades																				*			

that any significant new source of sulphur dioxide in the region would be designed and located so as to protect residential areas, i.e. proponents of new sources would be expected to minimise any additional impact of sulphur dioxide on the policy area and other surrounding areas of human residence. Proponents of new sources would also be required to address other potential environmental impacts of sulphur dioxide. No firm guidelines for new sources are proposed by the Authority at this stage as the Authority does not wish to limit the initiative of proponents in optimising their operations consistent with the broad environmental objectives stated above. The environmental impact assessment process facilitates this optimisation.

4.3 AMBIENT AIR QUALITY OBJECTIVES FOR SULPHUR DIOXIDE

The ambient air quality objectives for sulphur dioxide contained within the draft policy were the subject of the bulk of comments received from the public. All comments on this subject from residents of the Kalgoorlie-Boulder area conveyed the opinion that the objectives were too high (or lenient). It is appropriate therefore to review the basis for the selection of these objectives and to discuss the Authority's perspective on the issue.

The objectives for 1 hour and 3 hour average concentrations were originally established (on an interim basis) in 1985, on the recommendation of the Task Force on Gold Roasting and Ambient Air Quality in Kalgoorlie. The 3 hour figure of 1 300 $\mu g/m^3$ is the United States Environmental Protection Authority (USEPA) short term secondary standard. The 1 hour figure of 2 000 $\mu g/m^3$ is an estimate of the 1 hour average which might be expected to accompany a 3 hour average of 1 300 $\mu g/m^3$. The other objective in the draft policy, 365 $\mu g/m^3$ for 24 hours, is a USEPA primary standard. The USEPA allows one exceedence per year of the 3 hour and 24 hour standards.

The preference of the gold and nickel industries for a 3 hour objective is based on their capability to react to real-time monitoring data in order to prevent exceedences of short term objectives by shutting down their plants. The Task Force argues in its final report (September 1987) that it is impractical to attempt reactive control of 1 hour average ground level concentrations in view of the lag time (comprising plant shutdown time plus plume travel time) which is involved in attempting to react to the characteristic high peaks in sulphur dioxide measured at monitoring stations. The report also points to the control strategy in place at Mt Isa which is based on the USEPA 3 hour standard. The Task Force and individual industries have contended that the USEPA 3 hour standard can be met in the Kalgoorlie-Boulder residential area via a reactive control strategy, without jeopardising the economic viability of industry. They are less certain about meeting the proposed 1 hour objective and have argued that implementation of the standard should be deferred until 1 July 1988 to allow the industries to gain further experience and data from the control strategy.

The National Health and Medical Research Council formally adopted the following sulphur dioxide goals at its 103rd Session in June 1987:

60 $\mu g/m^3$	annual mean
700 $\mu g/m^3$	hourly mean
1400 $\mu g/m^3$	10 minute mean

These goals are to be expressed at 0^oC and 101.3 kPa.

Comparison of the USEPA 3 hour goal with the NHMRC 1 hour goal or, for that matter, virtually any current Australian or international short term sulphur dioxide standard, reveals a significant difference in magnitude. This difference can be largely explained in terms of the subjectivity involved in determining an appropriate degree of protection to be achieved via standards. The Authority is sensitive to the contrast in magnitude of these standards but views the adoption of the USEPA goal as justified in this case, given the dependence of the Kalgoorlie-Boulder area on mineral processing activity. With respect to the selection of a 3 hour objective rather than a 1 hour objective for use in the control strategy however, the Authority's view is pragmatic; this selection is justified on the basis of the stated inability of industry to respond to a shorter term objective. As correctly identified by public comments, pollution events at locations within the Kalgoorlie and Boulder townships are characterised by high, short term (ie several minutes) peaks of concentration, with total exposure time frequently less than 1 hour. A 3 hour average calculated for such an event arguably constitutes more severe pollution than a numerically equivalent 3 hour average comprised of persistent lower concentrations (such as might be experienced in a heavily industrialised region with many sulphur dioxide sources). The Authority is keen to promote maximum effort by industry to address this issue, and is encouraged by the latest estimate of a 5 minute shutdown time for the largest gold roaster.

The Authority is familiar with the sulphur dioxide control strategy employed at Mt Isa, which the industries at Kalgoorlie have cited as an example. The Authority is also familiar with a similar control strategy employed at Port Kembla, based on sulphur dioxide objectives which are more stringent than those used at Mt Isa. Both the Mt Isa and Port Kembla examples differ significantly from Kalgoorlie in terms of the underlying circumstances and therefore the Authority views neither as being directly applicable.

In response to submissions from industry seeking an exceedence allowance (once per industry) on the 3 hour control objective, the Authority views this as undesirable and has retained the objective as an upper limit, not-to-be exceeded value. If, as part of a future review of the policy, the Authority decides to recommend that 1 hour concentrations be directly controlled, that would be an appropriate occasion to reconsider the issue of exceedence allowances. It is noted that the gold roasters already incorporate a factor of safety in their control strategy to prevent exceedences from occurring.

4.4 POLICY AREA

The area to which the policy applies, as depicted in Figure 1 of Schedule A of the policy, is a simple geometric shape which incorporates almost all of the combined residential area of Kalgoorlie-Boulder. The outlying residential localities of Parkeston, Williamstown and Trafalgar are not included.

Several public submissions noted the exclusion of the above-mentioned outlying localities and also the towns of Coolgardie and Kambalda, and requested that these be incorporated.

The Authority's decision to limit the policy area in the draft policy was a conscious compromise to achieve a potentially workable sulphur dioxide control strategy. Inclusion of these areas would increase the average percentage of time in which roaster plumes blow across the policy area from

58% to approximately 76%. The associated number of necessary shutdowns under a reactive control strategy would correspondingly increase (not necessarily proportionally). The separation of these outlying localities from the main residential area would necessitate the installation of at least 2 and possibly 3 more real-time monitoring stations as part of the reactive control strategy. The combined effects of the above would impact significantly on the viability of the control strategy, at least in its early period of implementation. Control of sulphur dioxide concentrations at Coolgardie and Kambalda would be even more problematic, due to the very long plume travel times which make reactive control of ambient concentrations virtually impossible. Since impacts on these distant towns is thought to be almost entirely due to the nickel smelter operation, the Authority proposes to consider this as a separate issue, not as part of this policy.

The policy area defined in the draft policy incorporates approximately 98% of the residential population living in close proximity to the Kalgoorlie-Boulder townships. The Authority believes that the policy area should remain unchanged, consistent with its view that the policy represents a significant step in controlling sulphur dioxide pollution around Kalgoorlie-Boulder, but not a comprehensive solution. The residential area of Trafalgar may be impacted by mining plans, but the residential areas of Parkeston and Williamstown are expected to continue to exist in the longer term. An assessment of pollution impact in these latter areas is warranted. The Authority recommends that a condition of licence be applied to the three existing gold roasters, requiring the licensees to conduct (jointly if they so desire) a programme of sulphur dioxide monitoring in the immediate vicinity of Parkeston and Williamstown, conforming to the general guidelines in Appendix C. The Authority will assess the monitoring data as it is collected, and should a severe pollution problem be revealed, the Authority will review all options for controlling the pollution (including modification of the policy) and make appropriate recommendations to the Minister for Environment.

4.5 POLICY ENFORCEMENT

Enforcement of the policy is facilitated through Clause 9 which refers to licence conditions to be applied to sources of sulphur dioxide under Part V of the Environmental Protection Act, 1986. Contravention of licence conditions is an offence under the Act and may attract penalties as specified in Schedule 1 of the Act.

A variety of comments and queries were made, mainly by industry, in relation to the draft licence conditions in Schedule C of the draft policy. This Schedule was included in the draft policy to indicate the manner in which control of sulphur dioxide levels would be achieved, but it is necessarily general and devoid of specific details and has consequently caused some confusion. Schedule C in the current draft policy has remained unchanged from the original except for minor changes in wording which help to clarify the intent of some conditions. Detailed discussions will be held with individual industries to provide a comprehensive understanding of licence conditions before these are imposed. The following brief discussion is provided to aid understanding of how the conditions inter-relate.

Condition 1 is a concise statement of the licensee's obligation to implement a control strategy in order to avoid exceedence of the 3 hour 1300 $\mu g/m^3$ objective. All other conditions spell out mandatory aspects of the operation of this strategy but do not limit the initiative of the licensee to improve the strategy.

Condition 2 specifies that the licensee must operate a sufficiently dense network of monitors to ensure compliance with Condition 1 over the policy area.

Conditions 2 and 3 allow licensees of separate industries to pool resources and operate a comprehensive sulphur dioxide and meteorological monitoring network (as approved by the Authority) which minimises individual cost and potentially minimises the time for which mandatory data is unavailable due to equipment failure. The other conditions are self explanatory, although the Authority has yet to provide details of performance criteria for sulphur dioxide and meteorological monitoring equipment. These criteria will allow licensees a reasonable period of time to repair or replace faulty equipment, assuming that a full range of equipment spares is held in stock and that the licensees have staff with the necessary expertise.

4.6 OTHER ISSUES RAISED IN PUBLIC COMMENTS

A variety of other issues, which do not relate directly to the major topics addressed in the preceding sections, were raised in comments received by the Authority. The more significant of these issues are addressed below.

Alternative means of controlling pollution levels were raised. The Task Force final report (1987) dismissed increasing stack height and sulphur dioxide removal as viable options and the Authority agrees with this assessment at the current time. Remote relocations of gold roasters appears to be the most viable, longer term solution. Alternative gold recovery processes may also hold a viable solution if the economics of these become more favourable.

The need to control pollutants other than sulphur dioxide was raised. Where applicable, this will be done via licence conditions. The current policy should remain specific to sulphur dioxide.

Effects on flora and fauna was raised as an issue not addressed in the draft policy. This issue is of greater significance outside of the policy area than inside, and so the policy is not the appropriate means of addressing it. Nevertheless it is worth noting that Western Mining Corporation is conducting a field study of the effects of sulphur dioxide on native vegetation.

The need for regular release of sulphur dioxide monitoring data to the public is acknowledged and the Authority will ensure that this occurs, whether direct from industry or via the Authority.

4.7 FUTURE REVIEWS OF THE POLICY

Section 36 of the Act specifies that an approved Environmental Protection Policy must be reviewed by the Authority within a period of 7 years from the date of approval, and that this review must be effected by means of a new draft policy which undergoes the full process of approval, including public review.

Clause 10 of the policy describes a set of circumstances under which a review may be initiated independent of the automatic review provision described above. Clause 10 reads:

> "In the event that the results of ambient sulphur dioxide monitoring in the policy area reveal that either Objective 1 or Objective 3 in

Schedule B have been individually exceeded on more than three separate days in any period of twelve calendar months, commencing after 30 June, 1988, the Authority shall consider the issue and may recommend to the Minister that the Minister direct the Authority to initiate a review of the Policy within three months of that direction."

Objectives 1 and 3 (relating to 1 hour and 24 hour concentrations respectively) are not enforced via licence conditions as is Objective 2, but the onus is nevertheless on the licensees to meet these policy objectives after an initial period of control strategy testing (ie until 30 June 1988). Failure to meet these objectives (with an exceedence allowance of 3 separate days) would indicate fundamental deficiencies in the control strategy in which event the Authority would examine, along with other options, the need to modify the policy.

5. CONCLUSIONS AND RECOMMENDATIONS

The Authority commends the draft policy to the Minister for Environment as representing a significant step towards controlling sulphur dioxide pollution from existing sources. It is quite likely that the Authority will recommend revision of the policy at a future date to take advantage of, or actively promote, improvements in air quality.

The Authority recommends that the Minister for Environment proceed to promulgate the policy in accordance with Part III of the Environmental Protection Act, 1986.

For the reasons discussed in Section 4.4, the Authority also recommends that a condition of licence be applied to the three existing gold roasters, requiring the licensees to conduct a programme of sulphur dioxide monitoring in the vicinity of Parkeston and Williamstown, conforming to the general guidelines in Appendix C of this report.

APPENDICES

APPENDIX A

DRAFT ENVIRONMENTAL PROTECTION POLICY FOR THE CONTROL OF SULPHUR DIOXIDE IN THE AIR ENVIRONMENT OF THE KALGOORLIE-BOULDER RESIDENTIAL AREAS DECEMBER 1987

Clause 1 This Order is promulgated under Section 31(d) of the Environmental Protection Act 1986.

Clause 2 This Order is divided into parts as follows:

Part I Preliminary
Part II Areas Covered by the Policy
Part III Beneficial Uses to be Protected
Part IV Ambient Air Quality Objectives for Sulphur Dioxide
Part V Means of Enforcing Compliance with the Policy
Part VI Review of the Policy

PART I - PRELIMINARY

Clause 3 In this Order, unless inconsistent with the context or subject matter:

"the Act" means the Environmental Protection Act 1986.

"the Authority" means the Environmental Protection Authority as constituted under the Act.

"policy area" means the area in which this policy shall apply, as prescribed in Clause 5.

"source" means a point or an area from which sulphur dioxide is emitted to the air environment.

Clause 4 The purpose of this Policy is to establish ambient air quality objectives for sulphur dioxide emitted by existing sources in and around the policy area; new sources of sulphur dioxide are not covered by this Policy but will be assessed by the Authority under Part IV of the Act and will be expected to meet more stringent controls on sulphur dioxide impact.

PART II - AREAS COVERED BY THE POLICY

Clause 5 This Policy applies to that portion of the environment comprising the air at or within five metres of ground level over those areas of the municipal districts of the Town of Kalgoorlie and the Shire of Boulder indicated in Schedule A.

PART III - BENEFICIAL USES TO BE PROTECTED

Clause 6 The following beneficial uses shall be protected in the policy area:

(a) all human activity and occupation within a mining town setting, including residential, recreation, education, employment and other occupational engagement;

DRAFT ENVIRONMENTAL PROTECTION POLICY FOR THE CONTROL OF SULPHUR DIOXIDE IN THE AIR ENVIRONMENT OF THE KALGOORLIE-BOULDER RESIDENTIAL AREAS DECEMBER 1987 (Cont'd)

(b) operation of existing gold roasting and nickel smelting industries with associated emission of sulphur dioxide gas into the atmosphere and dispersion of these emissions in and around the policy area.

PART IV - AMBIENT AIR QUALITY OBJECTIVES FOR SULPHUR DIOXIDE

Clause 7 The ambient air quality objectives for sulphur dioxide are those which will provide an acceptable degree of protection for the identified beneficial uses specified in Clause 6.

Clause 8 The ambient air quality objectives for sulphur dioxide in the policy area shall be those specified in Schedule B.

PART V - MEANS OF ENFORCING COMPLIANCE WITH THE POLICY

Clause 9 For the purpose of enforcing compliance with the Policy the Chief Executive Officer may, in granting a licence under Part V of the Act, require the licensee to comply with, in addition to any other conditions, all or any of the conditions in Schedule C of this Policy in relation to any source that may cause or contribute to ambient concentrations of sulphur dioxide that exceed Objective 2 set forth in schedule B of this Policy.

PART VI - REVIEW OF THE POLICY

Clause 10 In the event that the results of ambient sulphur dioxide monitoring in the policy area reveal that either Objective 1 or Objective 3 in Schedule B have been individually exceeded on more than three separate days in any period of twelve calendar months, commencing after 30 June, 1988, the Authority shall consider the issue and may recommend to the Minister that the Minister direct the Authority to initiate a review of the Policy within three months of that direction.

DRAFT ENVIRONMENTAL PROTECTION POLICY FOR THE CONTROL OF SULPHUR DIOXIDE IN THE AIR ENVIRONMENT OF THE KALGOORLIE-BOULDER RESIDENTIAL AREAS
DECEMBER 1987 (Cont'd)

SCHEDULE A

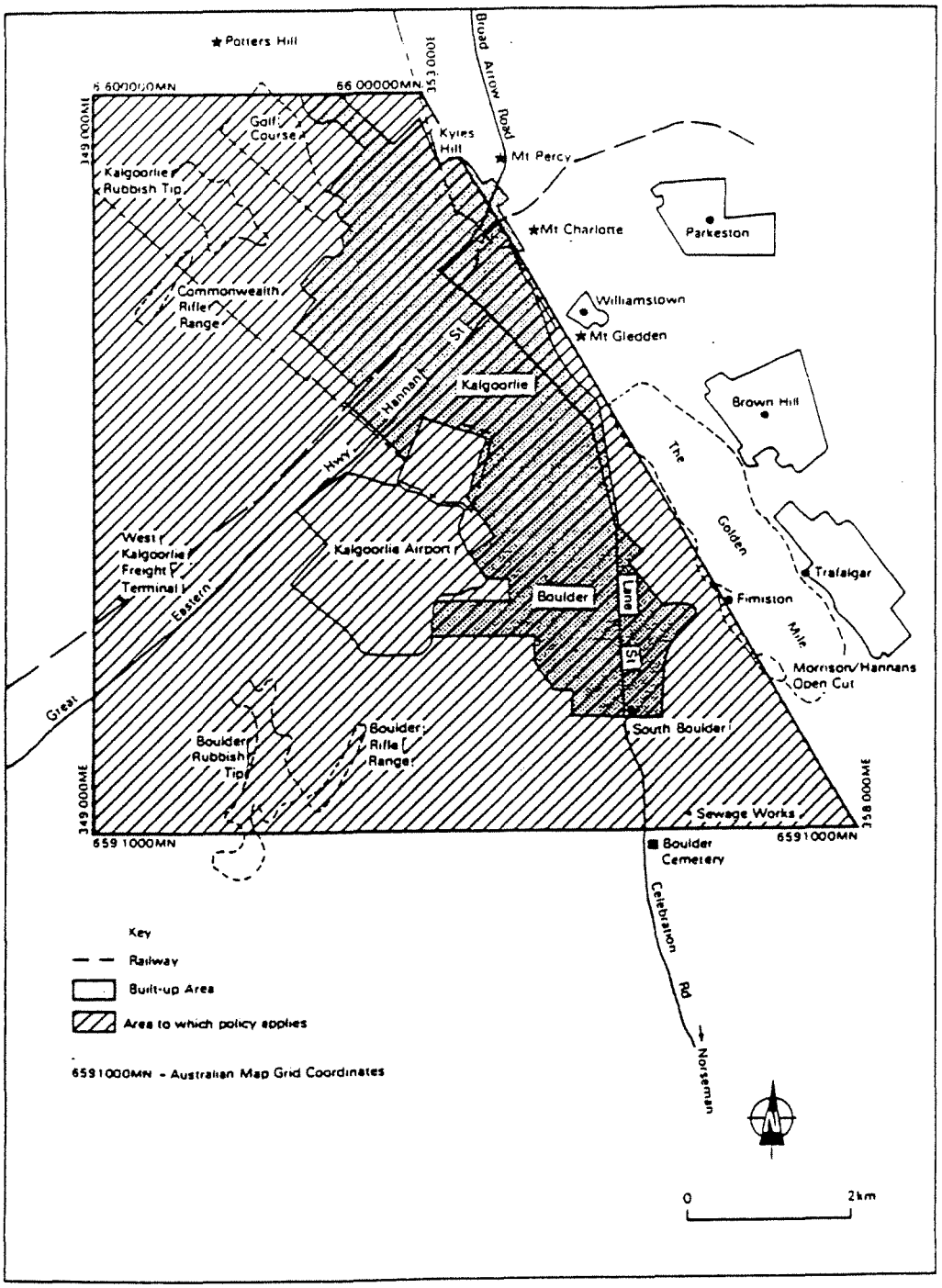
AREA TO WHICH THIS POLICY APPLIES

The area to which this policy applies is that delineated on the map of the Kalgoorlie and Boulder townships appearing in figure 1 hereof, and having the shape of a trapezoid, the boundaries of which are described as follows:

from a point 6600000 mN and 349000 mE, easterly to a point 6600000 mN and 353000 mE, thence generally south easterly to a point 6591000 mN and 358000 mE, thence westerly to a point 6591000 mN and 349000 mE, thence northerly returning to the point 6600000 mN and 349000 mE, where the coordinates of the points are referenced to the Australian Map Grid.

DRAFT ENVIRONMENTAL PROTECTION POLICY FOR THE CONTROL OF SULPHUR DIOXIDE IN THE AIR ENVIRONMENT OF THE KALGOORLIE-BOULDER RESIDENTIAL AREAS DECEMBER 1987 (Cont'd)

figure 1



DRAFT ENVIRONMENTAL PROTECTION POLICY FOR THE CONTROL OF SULPHUR DIOXIDE IN THE AIR ENVIRONMENT OF THE KALGOORLIE-BOULDER RESIDENTIAL AREAS DECEMBER 1987 (Cont'd)

SCHEDULE B

AMBIENT AIR QUALITY OBJECTIVES FOR SULPHUR DIOXIDE

1. The ambient air quality objectives for sulphur dioxide referred to in Part IV of the Policy shall be as follows:

OBJECTIVE NO.	UNIT	AVERAGING PERIOD	OBJECTIVE
1	$\mu g/m^3$	1 hour	2 000
2	$\mu g/m^3$	3 hours	1 300
3	$\mu g/m^3$	1 day	365

where -

(a) $\mu g/m^3$ is the concentration of sulphur dioxide in micrograms per cubic metre of dry air at 0°C and one atmosphere (101.325 kPa);

(b) a 1 hour averaging period is any 60 minute period;

(c) a 3 hour averaging period is any 180 minute period; and

(d) a 1 day averaging period is a period of 24 hours beginning at midnight on one day and ending at midnight on the next following day.

2. For the purpose of measuring the concentration of sulphur dioxide in air, one part per million is equivalent to 2857 $\mu g/m^3$.

DRAFT ENVIRONMENTAL PROTECTION POLICY FOR THE CONTROL OF SULPHUR DIOXIDE IN THE AIR ENVIRONMENT OF THE KALGOORLIE-BOULDER RESIDENTIAL AREAS DECEMBER 1987 (Cont'd)

SCHEDULE C

CONDITIONS

1. The licensee shall conduct its operations so as not to exceed or contribute to the exceedence anywhere within the policy area of a 3 hour average sulphur dioxide concentration of 1 300 $\mu g/m^3$, being Objective 2 of Schedule B of this Policy.

2. (i) The licensee shall monitor sulphur dioxide at a sufficient number of locations within the policy area to ensure compliance with Condition 1 above.

   (ii) The licensee shall obtain written approval from the Chief Executive Officer of the Environmental Protection Authority for the sulphur dioxide monitoring and data acquisition equipment used.

   (iii) The licensee shall advise the Chief Executive Officer of the location of each monitoring station.

3. The licensee shall monitor a range of meteorological variables specified by the Chief Executive Officer using equipment approved by the Chief Executive Officer, at one or more locations approved by the Chief Executive Officer.

4. The licensee shall provide to the Chief Executive Officer data from all sulphur dioxide monitors specified by the Chief Executive Officer and from the meteorological monitoring system at the intervals of time and in the form specified by the Chief Executive Officer.

5. The licensee shall provide the Chief Executive Officer with a log of plant shutdowns relating to the control of sulphur dioxide emissions, at the intervals of time and in the form specified by the Chief Executive Officer.

6. The licensee shall cease roasting operations immediately when any sulphur dioxide monitor specified by the Chief Executive Officer indicates exceedence of Objective 2 of Schedule B of this Policy and the meteorological monitoring system indicates that the wind is blowing from a direction specified by the Chief Executive Officer, or the meteorological monitoring system is unable to provide wind direction data.

7. Where any sulphur dioxide monitoring station specified by the Chief Executive Officer fails to meet performance criteria specified by the Chief Executive Officer, the licensee shall cease roasting operations whenever the meteorological monitoring system indicates that the wind is blowing from a direction specified by the Chief Executive Officer or the meteorological monitoring system is unable to provide wind direction data.

8. Where the meteorological monitoring system fails to meet any of the performance criteria specified by the Chief Executive Officer, the licensee shall cease roasting operations.

APPENDIX B

LIST OF PEOPLE AND ORGANISATIONS MAKING SUBMISSIONS

R A Adrian
Consulting Metallurgist
Arseno Processing (Australasia) Pty Ltd
FLOREAT PARK WA 6014

J G Ahern
Principal
John Paul College
KALGOORLIE WA 6430

B Churchwood
President
Conservation Council of Western Australia Inc
PERTH WA 6000

S Clayton
KALGOORLIE WA 6430

J & W Coggon
KALGOORLIE WA 6430

Commissioner of Health
Health Department of Western Australia
PERTH WA 6000

Coordinator
Department of Resources
Development
PERTH WA 6000

S Doust
KALGOORLIE WA 6430

Executive Director
Department of Conservation and Land Management
COMO WA 6152

R G Hadlow
Shire Clerk
The Shire of Boulder
KALGOORLIE WA 6430

B J Hall
KALGOORLIE WA 6430

C Hare
KAMBALDA WA 6442

M J Joyce
KALGOORLIE WA 6430

S Lundberg
Commissioner for Aboriginal Planning
Aboriginal Affairs Planning Authority
WEST PERTH WA 6005

LIST OF PEOPLE AND ORGANISATIONS MAKING SUBMISSIONS (Cont'd)

Dr R Mandyczewsky
WA Branch President
The Royal Australian Chemical Institute
EAST PERTH WA 6001

N D McKay
COOLGARDIE WA 6429

S Peebles
Convenor
Goldfields Against Serious Air Pollution
KALGOORLIE WA 6430

Z Potter
COOLGARDIE WA 6429

John Rowe
General Manager - Operations
Dallhold Resources Management on behalf of North Kalgurli Mines Ltd
PERTH WA 6000

J D Stewart
Corporate Lawyer
Western Mining Corporation Ltd
BELMONT WA 6104

J Stocker
DAWESVILLE WA 6210

R Williams
KALGOORLIE WA 6430

APPENDIX C

GUIDELINES FOR SULPHUR DIOXIDE MONITORING AT OUTLYING RESIDENTIAL LOCALITIES

The licensees of the three existing gold roasters in the Kalgoorlie-Boulder area shall conduct a sulphur dioxide monitoring programme conforming to the following general guidelines:

1. A sulphur dioxide monitoring station should be installed at a location in close proximity to Parkeston and Williamstown. Sulphur dioxide monitoring results should be recorded automatically but need not be available in real time. Approval of the Chief Executive Officer should be obtained for the site and composition of the monitoring station.

2. The monitoring station should be operated with a data recovery rate exceeding 80% in every calendar month over the period July 1988 to June 1989 and the data made available to the EPA and the public on a monthly basis in a form approved by the Chief Executive Officer.