Discussion Paper

Review of the *Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Policy 2003*

Environmental Protection Authority

December 2009

Submissions

The purpose of this document is to invite public comment and discussion for the Environmental Protection Authority (EPA) to consider regarding the forthcoming review of the *Environmental Protection (Goldfields Residential Areas)(Sulfur Dioxide) Policy 2003.*

The EPA welcomes your comments. Written submissions should be lodged by **8 February 2010**. All submissions will be acknowledged and a summary of submissions will be available from the EPA.

Submissions can be mailed to:

Environmental Protection Authority
Locked Bag 33, Cloisters Square
Perth WA 6840

Or emailed to policy@epa.wa.gov.au and enter "Review of the Goldfields EPP" in the subject line.

This document can also be viewed on the EPA website www.epa.wa.gov.au

Environmental Protection Policies

An Environmental Protection Policy (EPP) is prepared under Part III of the *Environmental Protection Act 1986* and has "the force of law as though it had been enacted as part of this Act", on and from the day on which the policy is published in the *Western Australian Government Gazette*. The Act is binding on the Crown. Accordingly, the wider community as well as all government departments and agencies are required under law to comply with both the Act and EPPs prepared under the Act.

An EPP establishes:

- the basis on which the portion of the environment to which the policy relates to is to be protected; and
- the basis on which pollution of, or environmental harm to, the portion of the environment to which the policy relates to is to be prevented, controlled or abated.

In addition, an EPP may:

- identify the portion of the environment to which the policy applies;
- identify and declare the environmental values of the environment to be protected under the policy;
- specify the environmental quality objectives to be achieved and maintained under the policy;
- set out the indicators, parameters or criteria to be used for measuring environmental quality in the policy area;
- relate to any activity directed towards the protection of the environment, including the discharge of waste;
- create offences and penalty provisions; and
- establish a program for the achievement and maintenance of the environment quality objectives within the policy area and may specify, among other things, measures designed to:
    i. minimise the possibility of pollution or environmental harm;
    ii. protect the environment; and
    iii. achieve the environmental values to be protected.

A diagram outlining the EPP process is provided at the back of this document. This review is at the stage of "Scoping by EPA and Discussion Paper" as shown in the diagram.

Cover page photos: Top & Middle –Emission from industry July 2009, (Peter Vasel); Bottom – Emission from industry March 2009 (Fiona Westcott).

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1. SUMMARY

In the early 1980s, industrial processes in the Goldfields region, specifically mineral processing contributed to the high concentrations of sulfur dioxide (SO_2) in the area. This resulted in poor air quality in the towns of Kalgoorlie and Boulder. In 1982, the Minister for the Environment established a Taskforce to investigate the extent and impact of the SO_2 emissions. In order to address the SO_2 pollution problem, and to provide an enforceable regulatory tool on the mineral processing industry, the Environmental Protection Authority (EPA) initiated an Environmental Protection Policy (EPP) to improve air quality in the residential areas. This Policy was approved under Part III of the *Environmental Protection Act 1986* (EP Act) in 1988 (Environmental Protection Authority, 1987).

The EPP for the Goldfields region has undergone a number of reviews since 1988. These reviews have resulted in approved policies in 1992 and 2003. There have been a number of major and minor changes to the Goldfields EPP during this time.

The *Environmental Protection (Goldfields Residential Areas)(Sulfur Dioxide) Policy 2003* (Goldfields EPP) and *Environmental Protection (Goldfields Residential Areas)(Sulfur Dioxide) Regulations 2003* (Goldfields Regulations) were gazetted on 18 March 2003 and took effect from this date. The Goldfields EPP and Goldfields Regulations are currently the principal tools used to regulate SO_2 in the Goldfields region.

Industry licences issued under Part V of the EP Act are underpinned by the Goldfields EPP to ensure an acceptable ambient air quality exists in the Goldfields residential areas. The holders of these licences are required to monitor the ambient concentrations of SO_2 at various monitoring stations situated within the boundaries of the Goldfields EPP area.

Monitoring of the ambient air quality in the Goldfields residential areas has shown an overall reduction in the concentration of SO_2 in the ambient air over the past two decades. This improvement in air quality has occurred as a result of: the commissioning of the Gidji Roaster, the decommissioning of the three in-town gold roasters; the installation of a sulfuric acid plant on the KNS facility, improvements in air quality control strategies that have been implemented by the major sulfur emitting industries, the Goldfields EPP and the national standards in the *National Environment Protection (Ambient Air Quality) Measure* (Ambient Air Quality NEPM).

Under section 36(1)(b) of the EP Act, the EPA is required to review an EPP within seven years of gazettal, in this case, by 18 March 2010. Before the review is initiated, the EPA has scoped the issues for a review and is seeking public comments on the way forward.

Accordingly, the EPA has prepared this document and invites public comment and suggestions to inform the EPA on the forthcoming review of the *Environmental Protection (Goldfields Residential Areas)(Sulfur Dioxide) Policy 2003.* Questions have been placed throughout the report to prompt discussion. You are encouraged to respond to these with your views. Details on how to make a submission are provided on the inside of the front cover.

2. BACKGROUND

Sulfur dioxide (SO_2) is a colourless, pungent, irritating gas that reacts on the surface of a variety of solid airborne particles. It is readily absorbed in the upper respiratory system and, at high concentrations, it causes acute bronchoconstriction and related effects.

Australian cities generally have low concentrations of ambient SO_2 which occurs as a result of emissions from anthropogenic sources (e.g. manufacturing of fumigants, food preservatives, bleaches and wine making) (National Pollutant Inventory, 2006).

In conjunction with these existing low concentrations of SO_2, the Goldfields area has additional emissions from industrial point sources – mainly gold and nickel ore processing. A large proportion of metallic ore in the Goldfields region contains sulfide minerals. During processing, the metallic ore is separated and concentrated, and then roasted in a sulfide oxidization process that releases SO_2 gas. In the 2007/08 reporting year, the National Pollutant Inventory (NPI) data showed that basic non-ferrous metal manufacturing contributed to 210,000 tonnes (91%) of SO_2 in the Kalgoorlie region. Metal ore mining contributed to 21,000 tonnes (9%) of SO_2 per year and electrical generations produced 3.5 tonnes (<1%) of SO_2 per year (National Pollutant Inventory, 2009).

Monitoring of ambient air has been carried out in the Goldfields region since the early 1980s. During the last 30 years, the concentration of SO_2 in the ambient air has dramatically reduced. Prior to the inception of the EPP and the Ambient Air Quality NEPM, the National Health and Medical Research Council (NHMRC) Guidelines (1996) provided benchmarks for the monitoring of SO_2. However, these guidelines did not have the statutory power to make them enforceable under available Western Australian law. As a result of the lack of regulatory tools available, the measured monthly one-hour averages of SO_2 emissions in the Goldfields area were recorded to be more than five times higher than the benchmark set by the NHMRC Guidelines 1996 (Government of Western Australia, 1998).

In 1988, the EPA developed the *Environmental Protection (Kalgoorlie-Boulder Control of Sulphur Dioxide in the Air) Policy 1988* to control the SO_2 concentrations in ambient air in the residential areas of Kalgoorlie and Boulder (Environmental Protection Authority, 1999). The EPA has the power to develop an EPP under section 26 of the EP Act.

The EPP was expanded four years later to include additional residential areas, these were Coolgardie, Kambalda and Kurrawang Aboriginal Reserve. This resulted in the gazettal of the *Environmental Protection (Goldfields Residential Areas)(Sulphur Dioxide) Policy 1992,* and associated *Environmental Protection (Goldfields Residential Areas)(Sulphur Dioxide) Regulations 1992*.

In 2003, after the 1992 EPP and associated regulations were reviewed, the policy and regulations were further amended. These amendments specified that the "maximum permitted sulfur dioxide concentration" in the ambient air was to be reduced from

0.35ppm[1] to 0.25ppm over the following two years. From 2005 and onwards, the "maximum permitted sulfur dioxide concentration" was to remain at 0.25ppm and this concentration is never to be exceeded. In addition the 2003 EPP seeks to ensure the ambient air concentration of SO_2 remains below 0.20ppm. One exceedence per year of the 0.20ppm value at any one place[2], is allowable from 2008 onwards.

The Goldfields EPP and associated regulations have been key regulatory instruments used to set conditions in industry licences issued under Part V of the EP Act.

3. EPP OBJECTIVES

3.1. Environmental Protection (Kalgoorlie-Boulder Control of Sulphur Dioxide in the Air) Policy 1988

In 1988 the *Environmental Protection (Kalgoorlie-Boulder Control of Sulphur Dioxide in the Air) Policy 1988* was gazetted setting out three objectives for the ambient air concentrations of SO_2 (Table 1).

Objective No.	Averaging Period	Objective µg/m^3	Equivalent ppm
1	1 hour	2000	0.7
2	3 hours	1300	0.45
3	1 day	365	0.128

Table 1. Air Quality Objectives for Sulfur Dioxide from the Environmental Protection (Kalgoorlie-Boulder Control of Sulfur Dioxide in the Air) Policy 1988.

The purpose of the 1988 EPP was to establish ambient air quality objectives for SO_2 emitted by existing industrial sources in and around the policy area. New sources of SO_2 were not covered by this Policy but were to be assessed by the EPA under Part IV of the EP Act and would be expected to meet more stringent controls on SO_2 emissions.

The air quality objective for SO_2 in this policy of 2000µg/m^3 equates to 0.7ppm. This air quality objective was exceeded on five occasions during the life of the EPP, occurring between 1988 and 1989 at the Kalgoorlie Hospital Monitoring site (Figure 1). After 1989 there was a noticeable improvement in the air quality with regards to SO_2 emissions. This can be attributed to the changes that were undertaken by industry in consultation with the state environmental agency of the time. The changes that assisted in reducing SO_2 concentrations in the ambient air for the Goldfields residential areas, included three of the four roasters (Paringa Roaster, Croesus Roaster and Oroya Roaster) closing; and the commissioning of the Gidji Roaster outside the residential areas of Kalgoorlie-Boulder in late 1990 (Government of Western Australia, 1998).

[1] ppm - parts per million
[2] "Any one place" is defined as a specified monitoring station

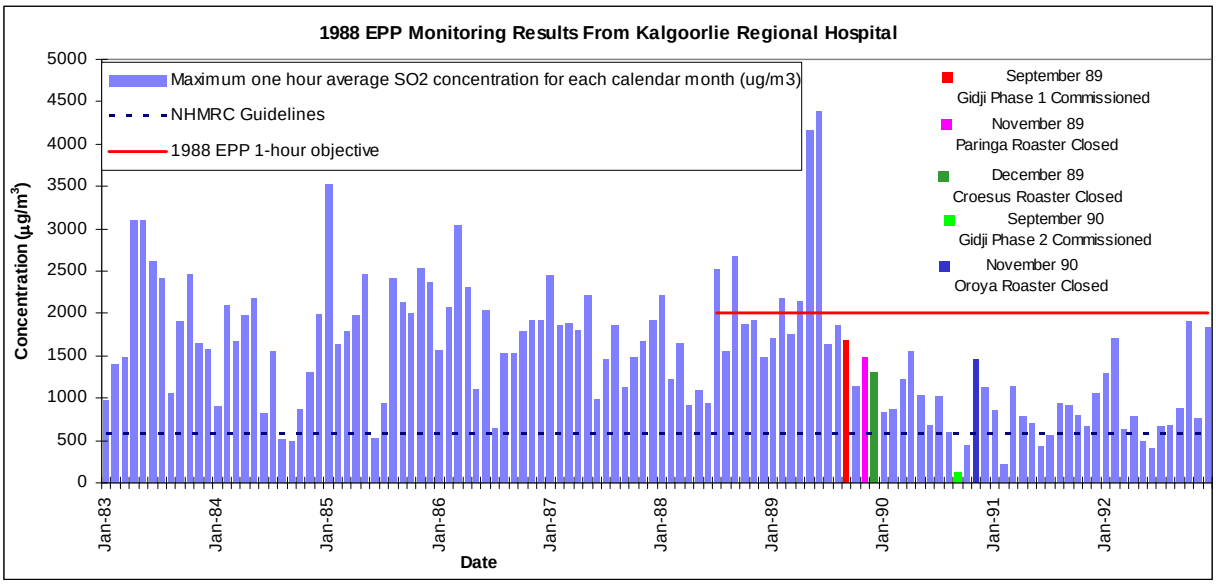

Figure 1. Kalgoorlie Regional Hospital SO_2 monitoring data. The significant events resulting in changes to the ambient sulfur dioxide concentration have been identified.

3.2. Environmental Protection (Goldfields Residential Areas) (Sulphur Dioxide) Policy 1992

In 1992, the Minister for the Environment directed the EPA to review the 1988 EPP. On 29 January 1993, the *Environmental Protection (Goldfields Residential Areas) (Sulphur Dioxide) Policy 1992* (1992 EPP) was gazetted. The 1992 EPP set a limit and standard for SO_2 concentrations for the ambient air. This set a single objective for the maximum concentration of SO_2 per hour, per day and on an annual basis. The 1992 EPP provided a 'step-down' approach to reduce concentrations of SO_2 in the ambient air of residential areas. As shown in Figure 2, the limit stepped down from 2000 µg/m^3 in 1994 to 1400 µg/m^3 in 1997. This set a limit that was never to be exceeded.

The standard was set at 700 µg/m^3 or 0.245ppm. The number of hours the standard could be exceeded was also stepped down from 131 hours in 1994 to 8 hours in 1997. This allowed industry to comply with the EPP ambient SO_2 concentrations over an agreed and specified timeframe.

During the 1992 EPP period, the nickel smelter closed temporarily for a period of two months and later undertook physical modifications to establish a sulfuric acid (H_2SO_4) plant. This plant captures the SO_2 and converts it into H_2SO_4. This reduces the amount of the SO_2 that is released into the atmosphere.

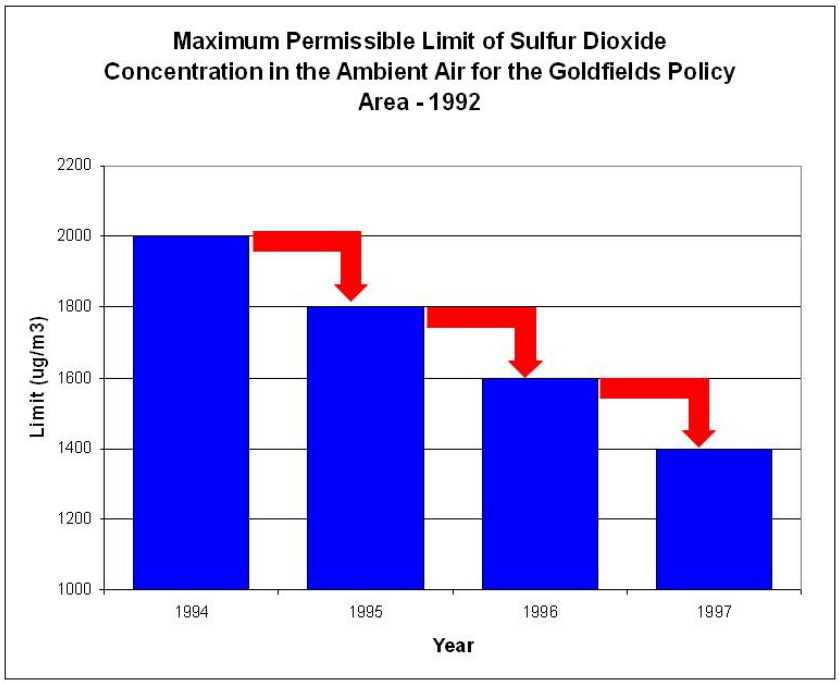

Figure 2. Ambient Air limits set by the 1992 Goldfields EPP

The monitoring station situated at the Kalgoorlie Hospital (Figure 3) recorded two exceedences of the limit between 1993 and 1998.

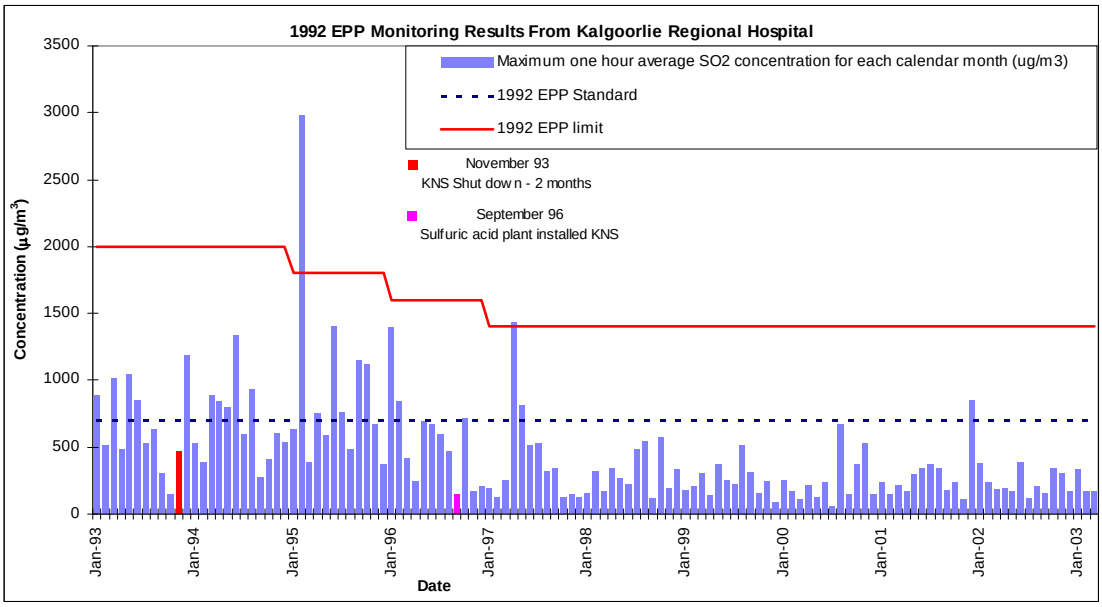

Figure 3. Maximum one hour average sulfur dioxide concentrations for each month at Kalgoorlie Hospital with significant events resulting in reductions to the ambient sulfur dioxide concentration

The long-term data for 1993 to 2003 (Figure 3) indicated that the general trend in ambient SO_2 concentrations decreased. This improvement in air quality resulted from the reduction in the number of sulfur emitting industrial plants operating in the area (with three of the original roasters located within Kalgoorlie closing upon the commissioning of the Gidji roaster outside of the residential area). In addition, Kalgoorlie Nickel Smelter (KNS) improved engineering controls to capture sulfur emissions. Licence conditions were established for the sulfur emitting industries that reflected the objectives of the 1992 EPP and Regulations.

3.3. Environmental Protection (Goldfields Residential Areas) (Sulphur Dioxide) Policy 2003

In 1999 a statutory review was undertaken for the 1992 EPP and a draft EPP was released for public comment to relevant stakeholders and community members. Submissions from a number of stakeholders expressed concern that industry would have difficulty meeting the more stringent 'limits' and 'standards' proposed in the time frame stipulated by the new draft EPP. This resulted in further consultation and negotiations between government and industry and as a result, the *Environmental Protection (Goldfields Residential Areas)(Sulphur Dioxide) Policy 2003* and *Environmental Protection (Goldfields Residential Areas)(Sulphur Dioxide) Regulations 2003* were gazetted in March 2003.

The 2003 EPP established the following:

- Removed the terms 'limits' and 'standards' that were used in the previous EPP;
- Replaced the term 'limit' with 'maximum sulfur dioxide concentration';
- Changed units of measurement from $\mu g/m^3$ to ppm;
- The maximum SO_2 ambient air concentrations was reduced from $1400\mu g/m^3$ (~0.49ppm) to 0.25ppm using a 'step-down' approach with the agreement of industry (Figure 4);
- The 1992 'standard' which was defined as a value that was desirable not to exceed, of $700\mu g/m^3$ (~0.245ppm) was removed and a new clause (clause 7) was introduced stating that if the level of SO_2 in the ambient air exceeded 0.20ppm at any one place within the policy area on more days than the EPP permitted, then the EPA must report this to the Minister;
- The concentration of SO_2 which is reportable to the Minister (0.20ppm) (reportable concentration) was adopted from the Ambient Air Quality NEPM and used in the 2003 EPP to protect the health and well-being of the residents in the Goldfields residential areas;
- The number of days which the reportable concentration was permitted to be exceeded was reduced from 3 days in 2003 to 1 day in 2008 and for each succeeding year;
- The 1992 EPP method of measuring the ambient air over a 'running hour' was changed to be over a 'clock hour'.
- The Kalgoorlie-Boulder policy area was expanded to the north.

Technical Box

Data for reporting on air quality for the 1992 EPP was taken over a running hour. A running hour is an hour period over any 60 minute period.

Data for reporting on air quality for the 2003 EPP is taken over the averaged clock hour. A clock hour means a sixty minute period commencing on the hour.

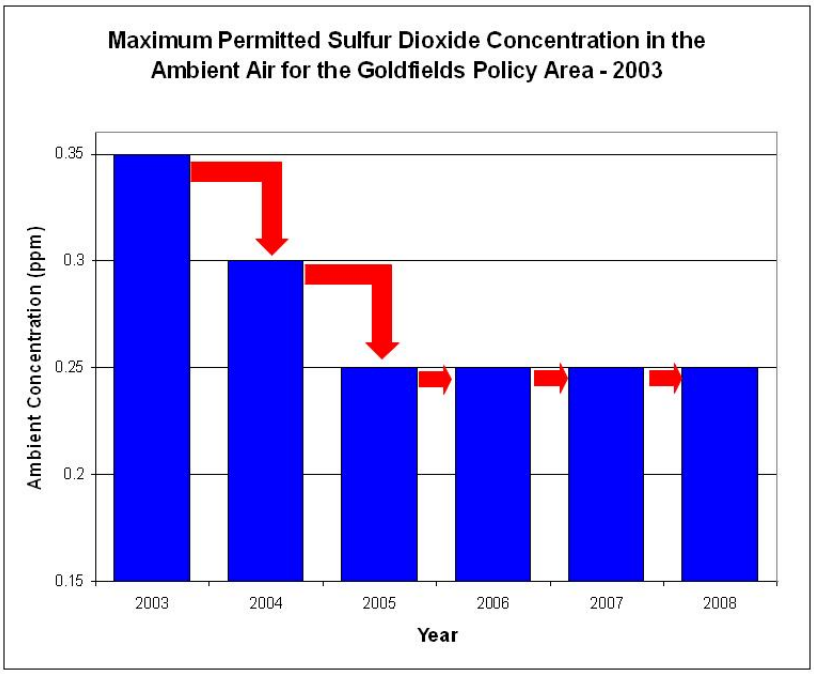

Figure 4. Maximum sulfur dioxide concentration set by the 2003 Goldfields EPP

The 2003 EPP consists of four separate policy areas. These areas cover Kalgoorlie-Boulder, Coolgardie, Kambalda and the Kurrawang Aboriginal Reserve. This is illustrated in Figure 5. The policy area for the Kalgoorlie-Boulder area was expanded, providing a greater portion of policy area to the north and west of the city of Kalgoorlie. This expansion of the EPP boundary only included the area that was already zoned for residential purposes, or proposed to be zoned residential, and had the intention to be developed within the next seven years. Since the last review in 2003, there has been housing development in these areas.

4. PERFORMANCE OF THE 2003 EPP (2003-2009)

The Goldfields EPP is seen by the community as an instrument for the improvement and maintenance of air quality for human health and well-being. The sulfur emitting industries in the Goldfields area are required to monitor the ambient concentrations of SO_2 within the EPP area, at the dedicated monitoring stations as part of their industry licence conditions.

Figure 6 shows the maximum one hour average sulfur dioxide monitoring results for each calendar month from 2003 to present. During this time, the maximum permissible SO_2 concentration has been exceeded on one occasion, in May 2005. This resulted in an infringement notice imposed on the Kalgoorlie Consolidated Gold Mine Gidji Roaster for a breach of their licence condition. This exceedence occurred at a single monitoring station (Coolgardie Primary School) within the EPP area.

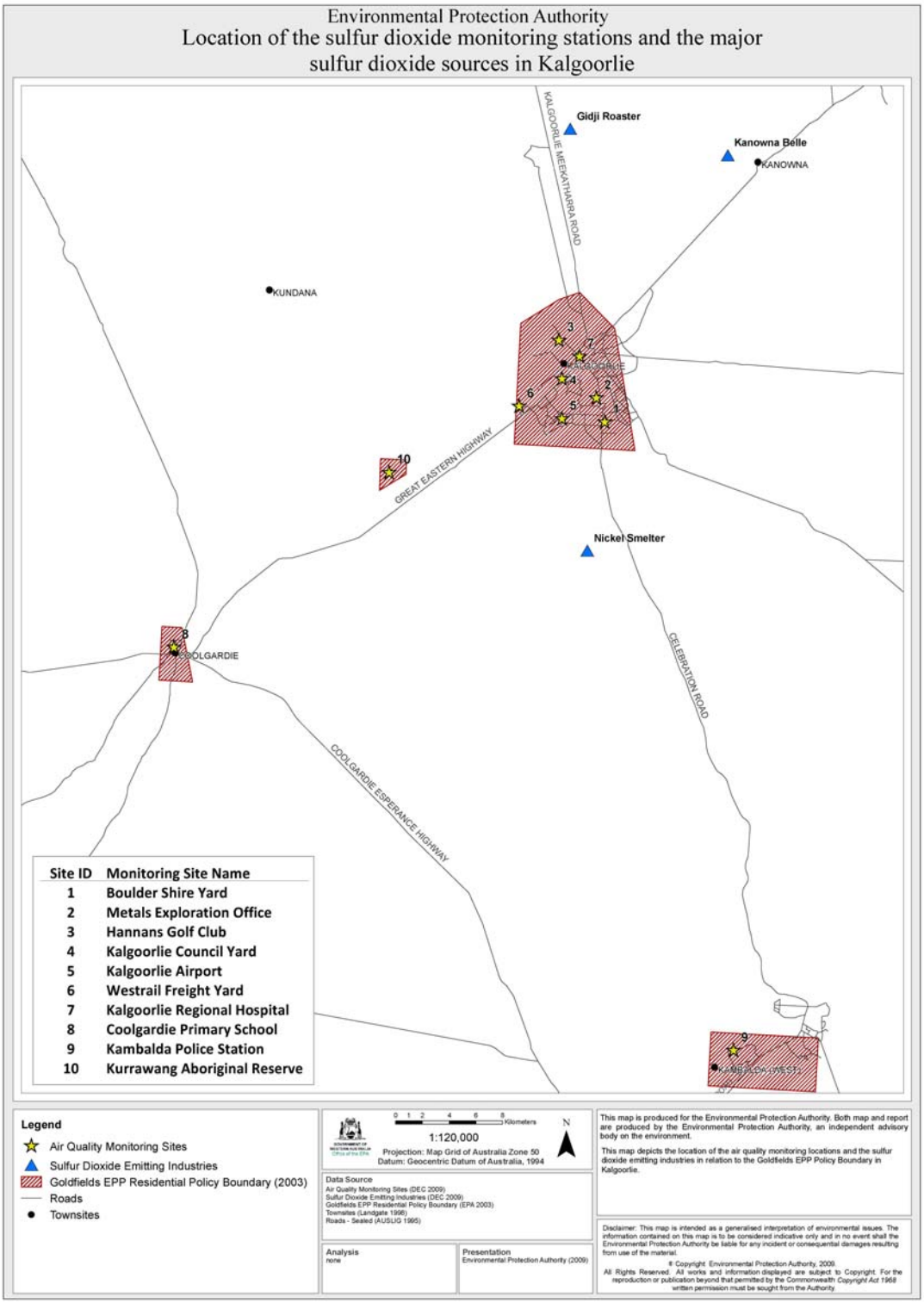

Figure 5. Map of the Environmental Protection Policy Areas, location of monitoring stations and SO_2 emitting industries

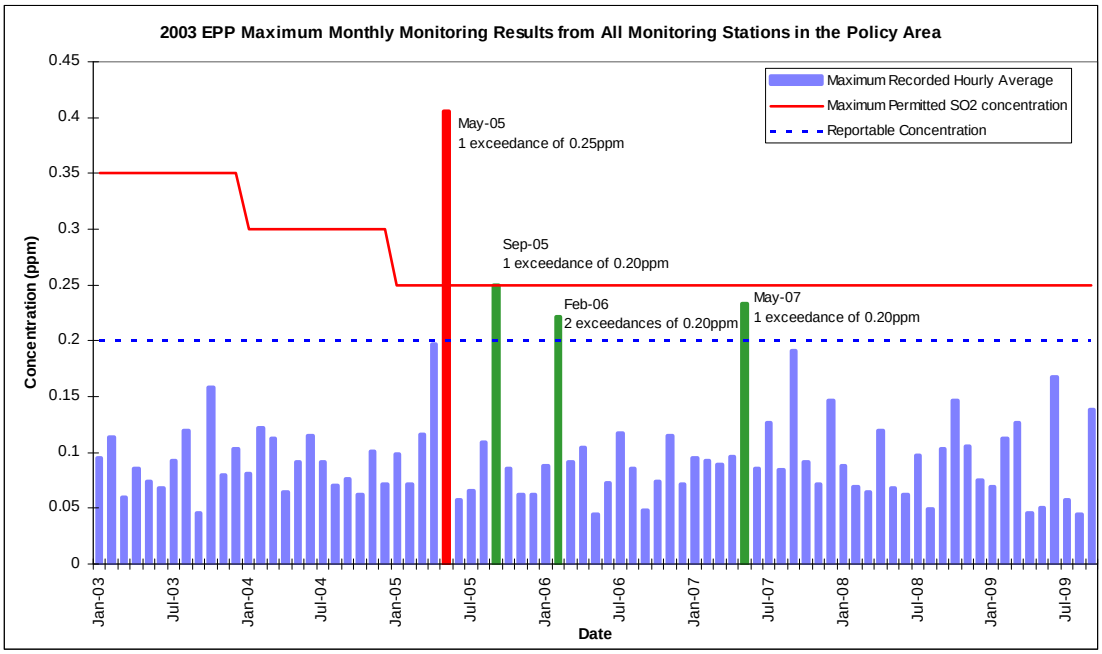

Figure 6. Ambient air concentrations of SO_2 for 2003-2009, illustrating the maximum permitted sulfur dioxide concentration. Measurements are taken over clock hours.

During 2003-2009, the reportable concentration set by the 2003 EPP (0.20ppm) has been recorded as being exceeded on at least four occasions among the specified monitoring stations within the EPP boundary (excluding the event in May 2005). Once in September 2005, twice in February 2006 and once at a single monitoring station in May 2007. The 2003 EPP allows for a maximum number of days for exceedences to occur per year at any one place. These exceedences were within the allowable number permitted under the 2003 EPP and no enforcement action was required.

With the exception of the incident in May 2005, the companies that are bound to the objectives and requirements of the 2003 EPP have succeeded in reaching the stipulated objectives. Thus the intended purpose of the 2003 EPP has been achieved.

5. Issues Considered by the EPA

5.1. Human exposure to SO_2 outside of protected areas

In early 2008, the DEC received 25 complaints from the community regarding visual amenity, odour and general concern about air quality in the area. DEC officers responded to these complaints and upon investigation, found that on some occasions the measured concentrations of SO_2 were approximately 0.7ppm (over a 1-hour average). This raises the issue that human exposure to high concentrations of SO_2 can occur outside the current protected areas.

A Satellite Monitoring Station (SAT) was installed by Kalgoorlie Consolidated Gold Mines (KCGM) to gauge the SO_2 emissions outside their gold roasting facility (Department of Environment and Conservation, 2009). The SAT is situated outside the Goldfields EPP area and close to the location of the KCGM facility and provides a record of SO_2 levels closer to the roaster. In 2008, this site recorded maximum one hour average sulfur dioxide concentrations for each calendar month between 0.38ppm

and 1.24ppm. These concentrations are in excess of the acceptable value for human health and have the potential to have a negative impact on the local environment. The SAT monitoring station was situated at its location to specifically monitor the frequency and intensity of any large SO_2 events.

Between December 2008 and March 2009 the Air Quality Management Branch and the DEC Goldfields Regional Office undertook monitoring at six locations, separate to those required by the EPP, as part of a short term air quality study. Ambient air was monitored over a seven day period using Radiello samplers. The monitoring locations were chosen based on the frequency of historic air quality complaints. This monitoring programme was undertaken to determine the average concentration of SO_2 to which selected parts of the population may be exposed. Given that the monitoring was conducted over a seven day period and used a different sampling method, it is not possible to directly compare the results with the Goldfields EPP criteria or the Ambient Air Quality NEPM. However, the preliminary results from this programme suggest that five of the six sites monitored had a similar range of ambient SO_2 concentrations and this was below the maximum permitted SO_2 concentration. The sixth site, located on the Goldfields Highway appeared to have more elevated concentrations. This suggests individuals may be exposed to SO_2 concentrations much higher than those specified in the Goldfields EPP and this could warrant further investigation (Department of Environment and Conservation, unpublished).

Can you suggest any areas that are not currently protected by the EPP, which in your opinion should be and why?

Technical Box

The Radiello sampling is a passive diffusive method of air sampling and is widely used to measure concentration of different gases at a specific point in time and space. The results of Radiello sampling that was undertaken in Kalgoorlie for SO_2 are not directly comparable with Air Quality NEPM protocol but can be used to provide an indication of SO_2 concentration.

5.2. Airshed management

The Goldfields EPP does not regulate or require monitoring of the SO_2 emissions from the stacks of local industries. Industry licences issued under Part V of the EP Act are underpinned by the Goldfields EPP to ensure an acceptable ambient air quality exists in the Goldfields residential areas. The holders of these licences are required to monitor the ambient concentrations of SO_2 at various monitoring stations situated within the boundaries of the Goldfields EPP area. The Goldfields EPP only provides protection for the residential areas against emissions that are directly discharged towards the residential areas, or have the potential to be influenced by meteorological conditions and be redirected towards the residential areas. As there is no requirement to control SO_2 concentrations outside of the protected residential areas the emitter can (and does), when favourable meteorological conditions arise, discharge SO_2 as an uncontrolled emission into the airshed.

The Goldfields EPP allows for protection to the human and natural environment within the boundaries (the residential areas) stipulated by the EPP only. Neither the current nor the previous EPPs have provided consideration of the effects that SO_2 may

have on the natural environment residing outside the boundaries of the EPP area. In addition consideration may be given to the effect that the emissions may have on inhibiting the development or beneficial uses of the surrounding areas now and in the future.

> Should industry have a limit on the amount of emissions that they can emit in addition to the current controls that protect the residential areas?

5.3. Vegetation in the Goldfields region

Annual monitoring is undertaken by industry (as part of their licence conditions) and funded studies (such as those by Dr Libby Mattiske) to assess the effects that SO_2 has on the vegetation in the Goldfields region. SO_2 can penetrate the leaves reducing the health of the plant. Acute SO_2 exposure can lead to reduced foliage in the vegetation, whilst chronic exposure can reduce the overall growth of the plant and reduce its fruit yield (Department of Environment and Conservation, unpublished).

Early investigations into the effects of SO_2 on vegetation near the KNS facility indicated that considerable damage was inflicted on vegetation up to 2km away from the smelting premises. Furthermore, chronic exposure to SO_2 was found in vegetation 3-5km away from the site by analysing the sulfur content in the leaves (Environmental Protection Authority, 1988). A subsequent report by Mattiske (2008) found that while there was some localised stress in the plant species near the KNS facility, there was also evidence of an improvement in the condition of the plant communities in the monitoring plots. The level of chemicals absorbed by the foliage was found to be relatively low in 2008 and this is thought to be related to the reduced emissions from the smelter. Mattiske (2008) also concluded that a number of factors influence the condition of the vegetation in the Kalgoorlie area, of which SO_2 is one.

> Is vegetation adequately protected outside the protected residential areas? If not, how should this be managed and why?

5.4. Threatened and Priority Flora and fauna

According to NatureMap®, there are 27 species (13 fauna, 14 flora) that are listed with some degree of conservation status within a 40km radius of Kalgoorlie (Table 2). From the investigations and research that were undertaken in the writing of this discussion paper, there was no evidence of monitoring conducted which assessed the impacts of SO_2 emissions on faunal species. Scoping activities were conducted for the commissioning of the Gidji Roaster, where it was identified that certain animal species existed in the area that had some level of conservation status, but little more was found about these animals following the commission and operations of the SO_2 emitting industries.

> Are there any animals or plants that you are concerned about that may be negatively affected by the SO_2 emissions?

Fauna	Flora
Rare or likely to become extinct *Egernia stokesii subsp. badia* *Leipoa ocellata* Malleefowl *Macrotis lagotis* Bilby, Dalgyte *Myrmecobius fasciatus* Numbat, Walpurti *Ogyris subterrestris subsp. petrina* Arid Bronze Azure Butterfly **Other specially protected fauna** *Morelia spilota subsp. imbricata* Carpet Python **Priority 1** *Branchinella denticulata* *Jalmenus aridus* (butterfly) **Priority 4** *Ardeotis australis* Australian Bustard *Charadrius rubricollis* Hooded Plover *Hylacola cauta subsp. whitlocki* Shy Heathwren (western ssp) *Oreoica gutturalis subsp. gutturalis* Crested Bellbird (southern) *Pomatostomus superciliosus subsp. ashbyi* White-browed Babbler (western wheatbelt)	**Priority 1** *Acacia epedunculata* *Eremophila praecox* *Gnephosis intonsa* Shaggy Gnephosis *Lepidium fasciculatum* Bundled Peppercress *Ptilotus procumbens* **Priority 2** *Elachanthus pusillus* Elacanth *Eucalyptus jutsonii* Jutson's Mallee **Priority 3** *Alyxia tetanifolia* *Angianthus prostratus* *Astartea sp. Bungalbin Hill* *Melaleuca coccinea* Goldfields Bottlebrush *Xanthoparmelia dayiana* **Priority 4** *Eremophila caerulea subsp. merrallii* *Eucalyptus x brachyphylla*

Table 2. Species identified as having a listed conservation status within the Goldfields region (Department of Environment and Conservation, 2007)

5.5. Other Emissions to the Atmosphere

The National Pollutant Inventory (NPI) is a cooperative programme implemented by the Federal, State and Territory governments, which provides community, industry and governments with information about emissions for NPI substances in Australia. When a facility reports their emissions, it is done through estimating their NPI emission substances to the receiving environment (National Pollutant Inventory, 2008).

The big emitters of SO_2 in the Goldfields region currently report their emissions to NPI. There is an array of other substances that are emitted by these industries. Licences that are issued by DEC currently require the industries in the Goldfields region to monitor their ambient SO_2 emissions. However, there is little consistency with the monitoring of other substances between these facilities.

> Should other substances in addition to SO_2 be included in the EPP (e.g. mercury)? If so what and why?

6. FUTURE OF THE GOLDFIELDS EPP

6.1. Does SO_2 require on-going monitoring in the Goldfields?

There are currently ten monitoring stations within the Goldfields EPP area that measure the SO_2 emissions from surrounding industries. These stations and their locations are illustrated in Figure 5. Data gathered from these stations are submitted to the DEC on a monthly basis to evaluate compliance with the Goldfields EPP.

Technical Box
These monitoring stations measure the ambient air for the concentration of SO_2 every two seconds and provide five minute averages which are used to determine ten minute, hourly, daily and annual concentrations of SO_2.

The ambient concentrations of SO_2 in the Goldfields EPP protected areas are generally well below the 'maximum permissible SO_2 concentration'. The recorded concentrations in the area are also generally below the NEPM ambient standard for SO_2. However, the emissions that are discharged from industry have the potential to increase within the EPP area if the EPP was removed and no alternative frameworks established to provide for the protection of air quality in the residential areas. As indicated in Section 5, there are additional monitoring stations situated outside of the EPP area which have recorded relatively high readings of ambient SO_2 concentrations.

The ongoing monitoring of industrial emissions of SO_2, and possibly other pollutants, is essential for managing air quality in the Goldfields region.

Should industry continue to monitor the SO_2 ambient concentrations in the Goldfields? Is the current monitoring programme adequate? Should more sites be monitored?

Would you like to see the air quality outside of the residential areas be managed? If so where and why?

Do you think that management of these areas should be implemented over a period of time (step-down approach) or implemented immediately?

6.2. Is an EPP still the most appropriate tool for managing SO_2?

The development of an EPP for managing the air quality issues for the Goldfields residential area was an appropriate and effective management response to the issue at the time of its implementation. An EPP allowed the DEC to manage the ambient air quality for a specified area (the residential areas contained within the EPP) and set a maximum permitted concentration for SO_2 to be achieved over time.

However, a comprehensive review must consider whether the Goldfields EPP continues to have an important role in the management of air quality. Changes to the EP Act since the Goldfields EPP was first gazetted in 1988, have incorporated many of the powers the EPP established, such as the provision for establishing a procedure for determining maximum permissible quantities. This can be done for a specific area. It is possible for the DEC to regulate industrial emissions for all 'prescribed premises'[3] through licence conditions or regulations.

[3] A prescribed premises is any premises that is referred to in Schedule 1 of the *Environmental Protection Regulations 1987*.

The EP Act is able to regulate industries on the basis of the conditions of what a 'prescribed premises' is permitted to emit and the amount of that emission that is to be discharged into the environment. If an industry exceeds the allowable level of a allowed pollutant, then enforcement action can be taken.

Technical Box

Examples of 'prescribed premises' are any premises' involved in:

- the processing or beneficiation of metallic or non-metallic ore (Category 5);
- metal smelting or refining fuse or process (Category 44).

Source: *Environmental Protection Regulations (1987)* Schedule 1, Part 1.

Western Australia has a comprehensive legislative and policy framework for managing air quality. Aspects of the framework did not exist at the conception of the Goldfields EPP.

The review of the 2003 Goldfields EPP provides the opportunity to make changes to the EPP, remove it altogether or replace it with a similar instrument if needed.

What should the goal or the objective be for the Goldfields EPP?

Should the objective be broadened to further improve the air quality in the Goldfields region?

Do you think that air quality in the Goldfields region still requires an EPP or similar tool for its management?

What would you think if the EPP was removed and another government instrument (e.g. Industry Licensing) was used to protect the Goldfields airshed?

7. NEXT STEPS

This paper explores some of the issues raised to date and provides the opportunity for comment on the potential amendments to the Goldfields EPP and associated Regulations. Comments are invited on any of the issues raised or questions asked throughout the discussion paper. Feedback received will be used to inform the EPA about the need to amend any aspect of the Goldfields EPP, if required, and the future of the policy in general.

Once public comments have been received an analysis of submissions will be prepared and considered. If appropriate, a new draft policy will be prepared, and will be made available for further comment as required under Section 36 of the EP Act.

Consultation on the new draft, or superseding documents, will again be followed by analysis and consideration of the comments received, and a new revised draft, or superseding documents, will be prepared and submitted to the Minister for Environment for consideration. The Minister will then decide whether or not to approve the revised EPP for consideration by Parliament.

8. REFERENCES

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National Health and Medical Research Council Guidelines, (1996). *Ambient Air Quality Goals Recommended by the National Health and Medical Research Council – rescinded* URL: http://www.nhmrc.gov.au/publications/synopses/withdrawn/rec1-2.pdf

National Pollutant Inventory (2006) *Sulfur Dioxide Factsheet* www.npi.gov.au/database/substance-info/profiles/77.html Last updated 21 August 2006

National Pollutant Inventory (2008) URL: www.npi.gov.au

9. DEFINITIONS AND ACRONYMS

Airshed

An area in which air quality is subject to common influences from meteorology, topography and emissions.

Ambient Air

Air that is 5m thick and is immediately above or surrounding any external surfaces of residential premises, or any other surface, situated in the Policy area.

Ambient Air Quality NEPM
National Environmental Protection (Ambient Air Quality) Measure.

At any one place
At a specified monitoring station located within the protected area of the Environmental Protection Policy.

DEC
Department of Environment and Conservation.

EP Act
The *Environmental Protection Act 1986*.

EPP
Environmental Protection Policy. A legal instrument that is prepared under Part III of the *Environmental Protection Act 1986*, and has the 'force of law as though it had been enacted as part of the Act.

EPA
Environmental Protection Authority.

Gazetted
Printed or published in the ***Government Gazette*** of Western Australia. This will indicate when the Policy will come into effect.

Goldfields EPP
Environmental Protection (Goldfields Residential Areas)(Sulfur Dioxide) Policy 2003.

Limit
The concentration of sulfur dioxide which shall not be exceeded.

Minister
Minister for Environment.

Maximum permitted SO_2 concentration
The maximum permitted sulfur dioxide concentration permitted in the ambient air at one place within a protected area during a calendar year.

$\mu g/m^3$
Micrograms per cubic metre. The concentration of an atmospheric waste in micrograms per cubic metre of dry air at 0 degrees Celsius and one atmosphere pressure.

NatureMap®
An online database that provides comprehensive and authoritative information on the distribution of Western Australia's flora and fauna.

NEPM
National Environmental Protection Measure. A legal instrument which set agreed national objectives for protecting particular aspects of the environment.

NHMRC
National Health and Medical and Research Council.

NPI
National Pollutant Inventory.

ppm
Parts per million by volume.

Prescribed premises
A prescribed premises is any premises that is referred to in Schedule 1 of the *Environmental Protection Regulations 1987.*

Priority 1
Taxa with few, poorly known populations on threatened lands - Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation.

Priority 2
Taxa with few, poorly known populations on conservation lands - Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks.

Priority 3
Taxa with several, poorly known populations, some on conservation lands - Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

Priority 4
Taxa in need of monitoring - Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.

SO_2
Sulfur dioxide.

Standard
The concentration of sulfur dioxide which it is desirable not to exceed.

Step-down
Progressive decrease in the amount of a substance that is emitted over time.

APPENDIX 1 - ENVIRONMENTAL PROTECTION (GOLDFIELDS RESIDENTIAL AREAS)(SULFUR DIOXIDE) POLICY 2003

Environmental Protection Act 1986

Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Policy Order (No. 2) 2003

Made by the Minister under section 37(3)(a) of the Act after receiving from the Authority an amended approved policy and a report on the policy under section 37(2) of the Act.

1. Citation

This order may be cited as the *Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Policy Order (No. 2) 2003*.

2. Confirmation of approved policy

(1) This order confirms the *Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Policy 2003** as amended by the Authority under section 37(2) of the Act in accordance with the minor changes to which the *Certificate of Agreement to Minor Changes of EPP (Goldfields Residential Areas) (Sulfur Dioxide) 2003*** relates.

[* *Published in Gazette 18 March 2003, p. 799-807.*]

[** *Published in Gazette 15 April 2003, p. 1203-4.*]

(2) The policy as amended is set out in the Appendix.

JUDY EDWARDS, Minister for Environment and Heritage.

Appendix to the *Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Policy Order (No. 2) 2003*

Environmental Protection Act 1986

Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Policy 2003

1. Citation

This policy may be cited as the *Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Policy 2003*.

2. Interpretation

In this policy —

"ambient air" of a protected area has the meaning given in clause 5;

"clock hour" means a sixty minute period commencing on the hour;

"ppm" means parts per million by volume of dry air;

"protected area" has the meaning given in clause 4;

"sulfur dioxide concentration" means the sulfur dioxide concentration averaged over one clock hour.

3. Purpose and objectives of policy

(1) The purpose of this policy is to specify the maximum sulfur dioxide concentration permitted in the ambient air of a protected area for the purposes of the *Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Regulations 2003*.

(2) The environmental quality objectives of this policy are —

(a) to control and progressively reduce the sulfur dioxide concentration in the ambient air of a protected area during each year until 2008; and

(b) to ensure that during and after 2008, the sulfur dioxide concentration in the ambient air of a protected area does not exceed 0.25 ppm.

4. Protected areas

(1) For the purposes of this policy, each of the following areas is a **"protected area"** —

(a) the area delineated on the EPP Map KALGJUN02 of the City of Kalgoorlie-Boulder, a representation of which is set out in Schedule 1; the boundaries of which run from a point 6600149mN and 349138mE north easterly to a point 6602083mN and 351905mE then east north easterly to a point 6602703mN and 353383mE then south easterly to a point 6600149mN and 356138mE then south south easterly to a point 6591149mN and 358138mE then westerly to a point 6591149mN and 349138mE then northerly to a point 6600149mN and 349138mE;

(b) the area delineated on the EPP Map KAMBJUN02 of the Town of Kambalda, a representation of which is set out in Schedule 2 and having the shape of a rectangle, the boundaries of which run from a point 6548149 mN and 366139 mE easterly to a point 6548149 mN and 374139 mE, then southerly to a point 6544149 mN and 374139 mE, then westerly to a point 6544149 mN and

366139 mE and then northerly to the point 6548149 mN and 366139 mE;

(c) the area delineated on the EPP Map COOLJUN02 of the Town of Coolgardie, a representation of which is set out in Schedule 3 and having the shape of a trapezoid, the boundaries of which run from a point 6576149 mN and 323638 mE easterly to a point 6576149 mN and 325138 mE, then generally south easterly to a point 6572149 mN and 326138 mE, then westerly to a point 6572149 mN and 323638 mE and then northerly to the point 6576149 mN and 323638 mE; and

(d) the area delineated on the EPP Map KURRJUN02 of the Kurrawang Aboriginal Reserve (being Reserve No. 23648, Jaurdi Location 23), a representation of which is set out in Schedule 4, the boundaries of which run from a point 6589527 mN and 339243 mE, then easterly to a point 6589555 mN and 341164 mE, then southerly to a point 6588480 mN and 341180 mE, then south westerly to a point 6587182 mN and 339277 mE.

(2) The bounding coordinates referred to in subclause (1)(a) to (d) are referenced to the Geocentric Datum of Australia (GDA) 1994 Map Grid of Australia Zone 51 (MGA).

(3) The originals of the maps referred to in subclause (1)(a) to (d) may be viewed during normal office hours at the Department's head office, Level 8, 141 St. George's Terrace, Perth WA 6000.

5. Ambient air of a protected area

For the purposes of this policy, the "**ambient air**" of a protected area is the portion of the environment comprising a layer of air 5 metres thick —

(a) immediately above, and immediately surrounding, the external surfaces of any residential premises situated in a protected area; and

(b) immediately above the surface of the remainder of a protected area.

6. Maximum permitted sulfur dioxide concentration

For the purposes of the *Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Regulations 2003*, the Table to this clause specifies the maximum sulfur dioxide concentration permitted in the ambient air at any place within a protected area during a calendar year listed in the Table.

Table

Calendar year	Maximum permitted sulfur dioxide concentration (ppm)
2003	0.35
2004	0.30

Calendar year	Maximum permitted sulfur dioxide concentration (ppm)
2005	0.25
2006	0.25
2007	0.25
2008 and each succeeding year	0.25

7. **Authority to report to Minister**

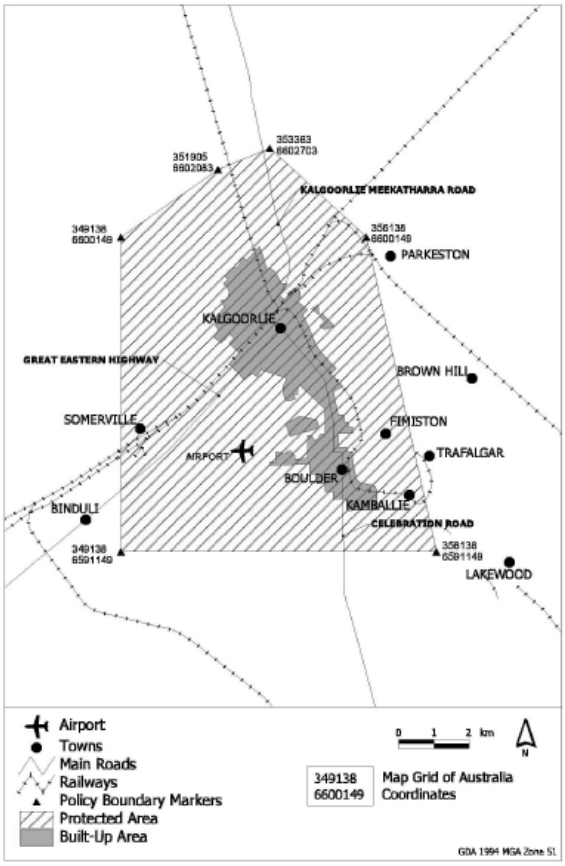
If the Authority determines that, during a year listed in the Table to this clause, the sulfur dioxide concentration in the ambient air at any one place within a protected area has exceeded 0.20 ppm on more than the number of days specified in the Table in respect of that year, then the Authority must report this to the Minister.

Table

Calendar year	Number of days
2003	3
2004	3
2005	2
2006	2
2007	2
2008 and each succeeding year	1

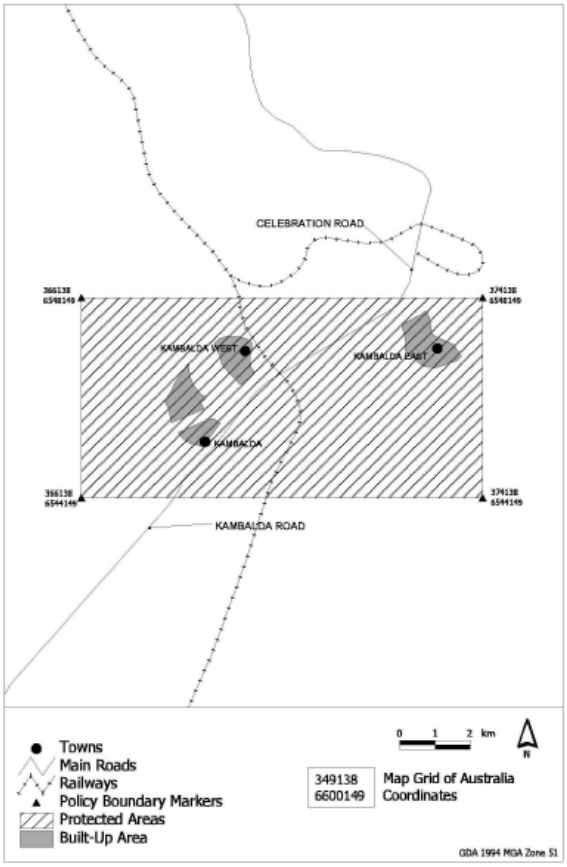
Schedule 1 — Representation of EPP Map KALGJUN02

[cl. 4(1)(a)]



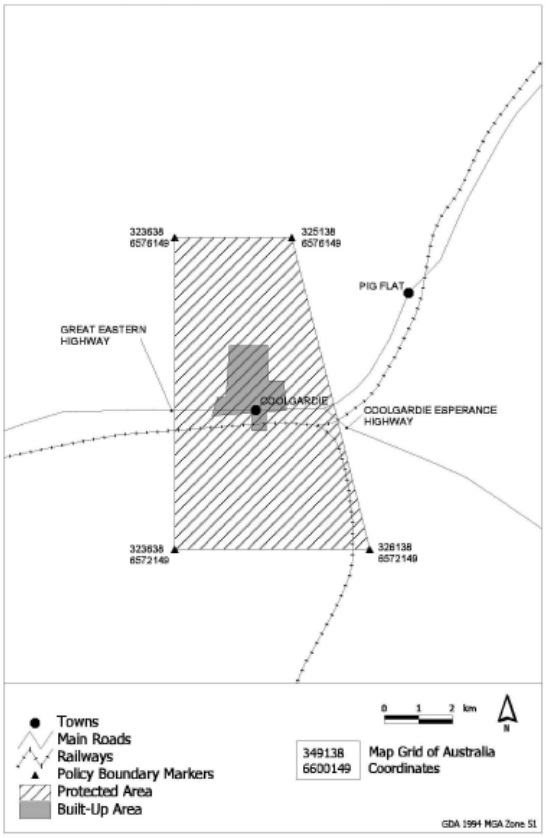
Schedule 2 — Representation of EPP Map KAMBJUN02

[cl. 4(1)(b)]



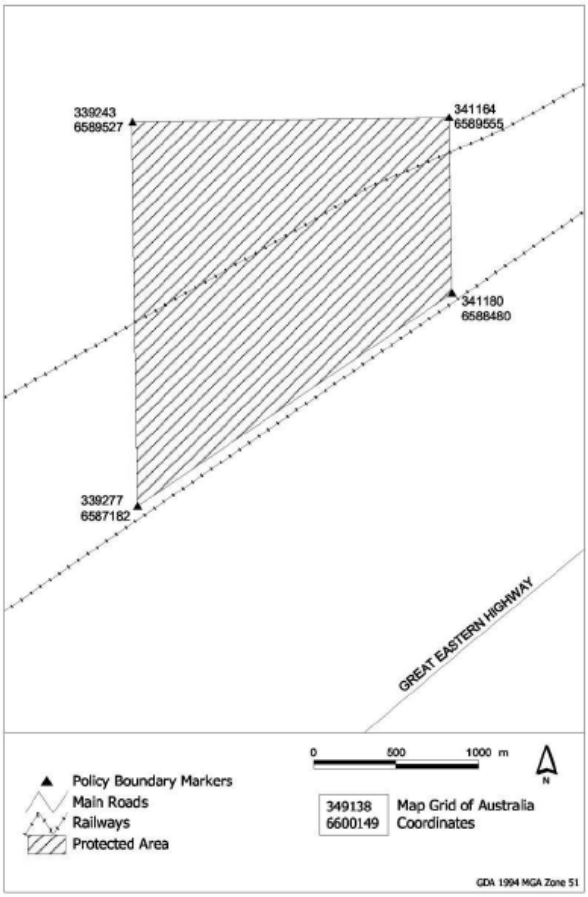
Schedule 3 — Representation of EPP Map COOLJUNO2

[cl. 4(1)(c)]



Schedule 4 — Representation of EPP Map KURRJUN02

[cl. 4(1)(d)]



APPENDIX 2 - ENVIRONMENTAL PROTECTION (GOLDFIELDS RESIDENTIAL AREAS)(SULFUR DIOXIDE) REGULATIONS 2003

Western Australia

Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Regulations 2003

As at 18 Mar 2003 Version 00-a0-07

Western Australia

Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Regulations 20033

CONTENTS

Western Australia

Environmental Protection Act 1986

Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Regulations 2003

1. Citation

These regulations may be cited as the *Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Regulations 2003*.

2. Commencement

These regulations come into operation on the day on which the policy comes into operation.

3. Interpretation

(1) In these regulations —

the policy means the *Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Policy 2003* approved under the *Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Policy Order 2003* and set out in Appendix 1 to that order.

(2) Unless the contrary intention appears, words and expressions defined in clause 2 of the policy and used in these regulations have the same respective meanings as they have in the policy.

4. Prescribed licence conditions for premises discharging sulfur dioxide

(1) The condition set out in subregulation (2) is prescribed for the purposes of section 62(1)(h) of the Act.

(2) The occupier must ensure that the operations on the premises are conducted in such a way as neither to cause, nor to contribute to causing, the maximum sulfur dioxide concentration permitted in the ambient air of a protected area under clause 6 of the policy to be exceeded at any place within the area.

5. Repeal

The *Environmental Protection (Goldfields Residential Areas) (Sulphur Dioxide) Regulations 1992* are repealed.

Notes

[1] This is a compilation of the *Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Regulations 2003.*

Compilation table

Citation	Gazettal	Commencement
Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Regulations 2003	18 Mar 2003 p. 806-7	18 Mar 2003 (see r. 2 and *Gazette* 18 Mar 2003 p. 799)

Flow diagram of the Environmental Protection Policy process under the *Environmental Protection Act 1986* showing statutory (light grey Boxes) and non-statutory (white Boxes) stages