Kwinana Industries Council

Safeguarding the community, employees and the environment.

WHAT IS KIMA?

What is KIMA?

The Kwinana Industries Mutual Aid (KIMA) organisation is a voluntary working group of technical specialists from within Kwinana industries who share emergency response expertise, manpower and resources in the event of a major emergency.

Full members of KIMA are those companies which are subject to the Explosives and Dangerous Goods regulations and which require a Total Hazard Control Plan.

Established in 1990, KIMA ensures that adjacent sites receive early warning of an emergency that may impact upon their site.

WHEN IS KIMA USED?

All incidents within a site are attended to initially by the Member Company concerned, using in-house expertise and emergency response equipment available at or near the site. All Member Companies hold sufficient equipment and have trained emergency response personnel to cope with foreseeable incidents that may occur on their site.

The KIMA plan is activated when an incident is beyond the capability of the Member Company concerned or when the incident will affect other industries.

The Kwinana Industries Council (KIC) was named 1994 Safety Manager of the Year for excellence in developing and administering the KIMA Safety Management Systems. Making the award, the Safety Institute of (Western) Australia said:

"The KIMA system is an outstanding achievement in occupational health and safety and demonstrates a genuine commitment to protecting the Australian workforce."

KEY ELEMENTS

Key Elements of the KIMA Programme

Emergency Assistance Agreement
All KIMA members have signed an agreement which commits them to maintain their own emergency response capability and to provide assistance to other companies if required.

Inter-industry Radio Communications and Training
An emergency radio communication system between Kwinana Industries has been established specifically for use by KIMA Member Companies. This is tested frequently.

Emergency Access Routes and Signage
Clearly signposted emergency access routes link KIMA Member Companies to provide easy access during emergencies.

KIMA Resource Manual
Each KIMA Member Company has copies of the KIMA Resource Manual. This manual provides information on how KIMA works and has details of the emergency response equipment owned by each company.

MEMBERS

KIMA Full Members are:

BP Refinery (Kwinana) Pty Ltd
Fremantle Port Authority
Nufarm Coogee Pty Ltd - Chlor Alkali Plant
Tiwest Joint Venture
Wesfarmers CSBP Limited
Wesfarmers LPG Pty Ltd
WMC Kwinana Nickel Refinery

Associate Member Companies are:

Air Liquide WA Pty Ltd
Alcoa of Australia Ltd
Australian Fused Materials Pty Ltd
BHP Transport Pty Ltd
BOC Gases Australia Limited
Cockburn Cement Ltd
Brambles Manford
CBI Constructors Pty Ltd
Coogee Chemicals Pty Ltd
Cooperative Bulk Handling Limited
Edison Mission (Kwinana) Pty Ltd
Environmental Solutions International Ltd
Hanwha Advanced Ceramics Pty Ltd
Hismelt Corporation Pty Ltd
Hoechst Schering AgrEvo Pty Ltd
Maxwell Chemicals Pty Ltd
Nalco Australia Pty Ltd
Nufarm Limited - Agchem Plant
Terminals West Pty Ltd
Thermal Ceramics Pty Ltd
Tubemakers of Australia Limited (BTM)
Tubemakers of Australia Limited (Water)
United Constructions Pty Ltd
Western Power - Kwinana Power Station

MANAGEMENT

Management of KIMA

The Kwinana Industries Council (KIC) administers KIMA.

KIMA members meet bi-monthly and are directly involved in the maintenance and continual improvement of the KIMA plan and Resource Manual.

KWINANA INDUSTRIES COUNCIL

Detailed analysis of scientific data collected since the late 1970s has revealed the waters of Cockburn Sound are the healthiest in 10 years.

Environmental background

Environmental deterioration of Cockburn Sound in the 1970s has been linked to massive increases in nitrogen loads from domestic wastewater and industrial discharges.

Local coastal waters are naturally low in nitrogen and increased inputs from human activities in Cockburn Sound have had a major impact on marine plant growth. The two main affects have been water discolouration caused by 'blooms' of phytoplankton (microscopic floating algae), and a dramatic decline in seagrass beds.

Since the 1970s, ongoing management strategies have reduced nitrogen inputs to the Sound. Nutrient inputs are now considerably less than 20 years ago and are mostly 'diffuse' sources such as groundwater, rather than 'point' sources such as discharges from industrial pipelines.

See Figure 1.

Cockburn Sound best in decade

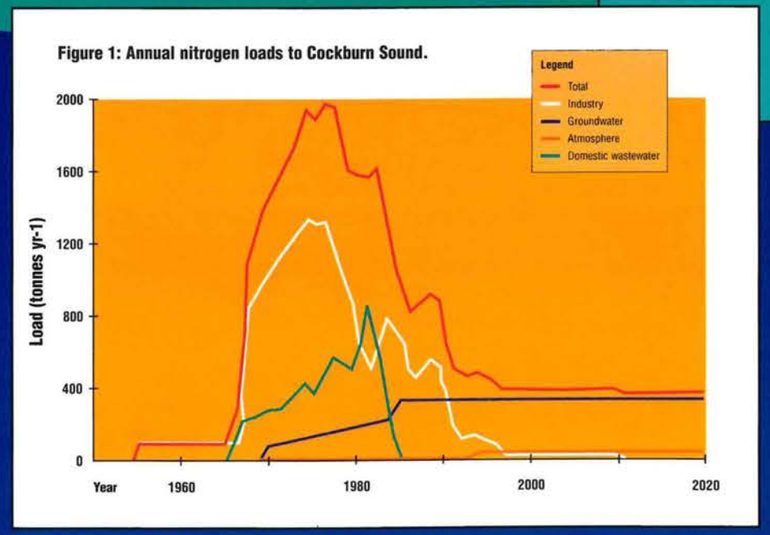
Detailed analysis of scientific data collected since the late 1970s has revealed the waters of Cockburn Sound are the healthiest in 10 years.

General water quality in the Sound is not deteriorating, proving strategies to reduce nutrient loads on this important marine environment are having positive and lasting effects.

Results from a water quality survey carried out during the summer of 1997/98 show continued overall improvement in water quality since the early 1990s. Conditions are now similar to those recorded in the mid 1980s.

Water clarity readings for 1997/98 are the best ever recorded.

Figure 1: Annual nitrogen loads to Cockburn Sound.



Source: Southern Metropolitan Coastal Waters study.

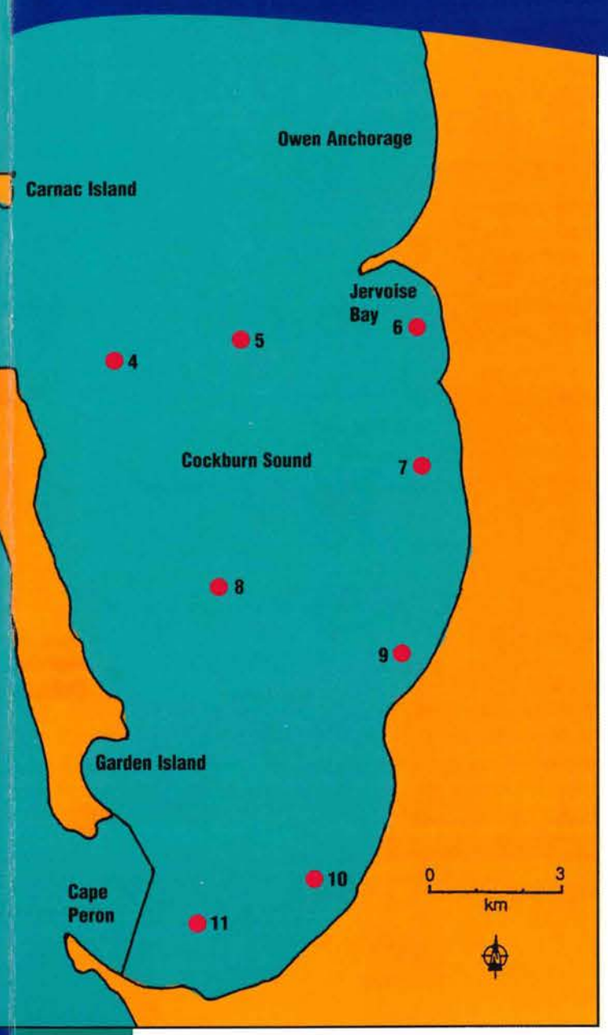


Figure 2: Location map of Cockburn Sound showing water quality monitoring sites

Good water quality indicators are measurements of microscopic algae and water clarity

Using water quality to measure environmental health

Since 1982, government and industry groups have monitored the environmental health of Cockburn Sound by doing weekly water quality surveys every two to three summers.

This assessment program involves eight sites in the Sound, and additional data has come from studies between the late 1970s and early 1980s.

See Figure 2.

Good indicators of water quality are measurements of microscopic algae or phytoplankton levels (chlorophyll a) and water clarity.

Chlorophyll a levels can reflect changing nutrient loads because the amount of phytoplankton in the water correlates with how much nutrient is available for their growth.

Phytoplankton levels strongly influence water clarity in Cockburn Sound during summer.

Direct measurements of nutrient levels in the water are considered less useful, as they can be affected by nutrient uptake by algae and nutrient exchange between the seabed and overlying waters.

Cockburn Sound water quality - past and present

Water quality in the Sound improved dramatically from the late 1970s to the early 1980s, due to a reduction in nitrogen inputs from industrial effluent.

Following the very low values of chlorophyll a and light attenuation readings over the summer of 1982/83, the chlorophyll a concentration increased slowly till the peak of summer 1991/92.

The chlorophyll a recorded during the summer of 1991/92 reached a peak which coincided with the highest summer rainfalls on record for Perth and the Kwinana region. These record rains resulted in significant nutrient rich outflows from the Swan River to the local coastal waters.

Today, two thirds of the nitrogen entering the Sound comes from groundwater.

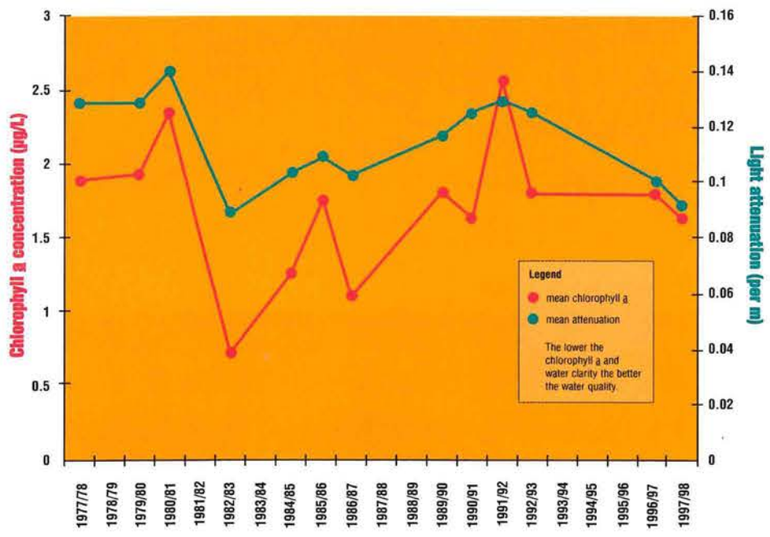
The Department of Environmental Protection has indicated the main source is from the central-eastern and north-eastern shoreline. Management strategies have been adopted to reduce groundwater nitrogen inputs from these areas.

The Kwinana Industries Council funded the 1996/97 and 1997/98 Cockburn Sound water quality surveys as part of an active industry approach to protecting the environmental health of this important waterway.

The summer surveys of 1996/97 and 1997/98 showed a marked improvement in water quality. The water clarity in Cockburn Sound during the summer of 1997/98 was the best on record and comparable with the water clarity during the summer of 1982/83. Lower light attenuation means better water clarity.

See Figure 3.

Figure 3: Summer water quality 1977 to 1998



Data Interpretation

Data interpretation was carried out independently by DA Lord & Associates Pty. Ltd., and the Marine & Freshwater Laboratory at Murdoch University.

The future

Through the Kwinana Industries Council, industry is taking a co-ordinated and active approach to protecting the health of Cockburn Sound by conducting monitoring and research programs and implementing appropriate management measures.

Further Information

Queries about the Kwinana Industries Council and its research into Cockburn Sound water quality can be directed to:

Executive Officer
PO Box 2195
Rockingham WA 6967

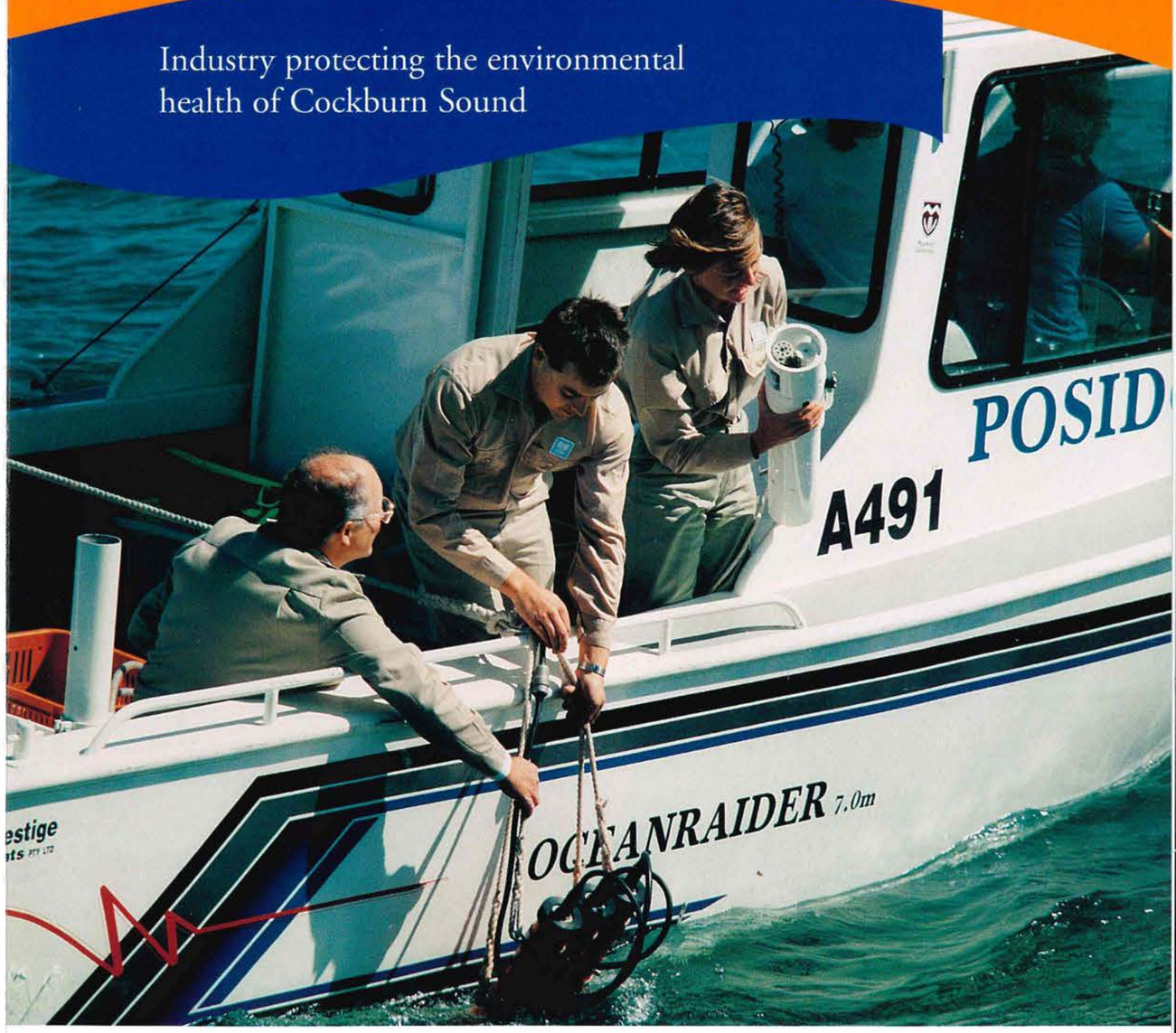
Telephone: 9411 0762
Facsimile: 9437 9033

Internet: http://www.kic.org.au
Email: kicmail@cciwa.asn.au

Insight Communication & Design

Water Quality Watch

Industry protecting the environmental health of Cockburn Sound



KWINANA INDUSTRIES COUNCIL

The Kwinana Air Quality Monitoring Network

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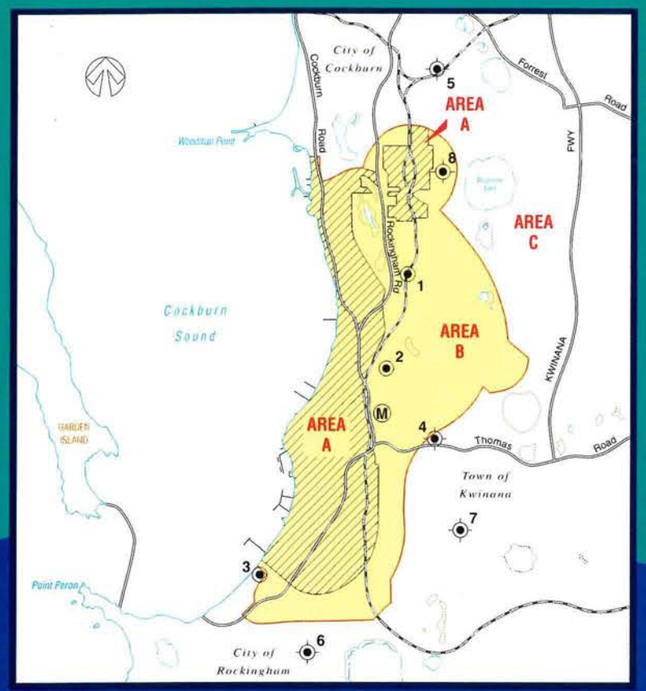
COUNCIL

Annual Average Sulphur Dioxide Concentrations (micrograms per cubic metre)



Locations of the monitoring stations and the defined EPP regions

Sulphur Dioxide Monitoring Stations

1 Wattleup
2 Hope valley
3 North Rockingham
4 Abercrombie Road, Postans
5 Muguel Road, Bibra Lake
6 Hillman PS (1993), Hillman*
7 Rhodes Park (1994), Calista*
8 Henderson Road (1995), Munster*
Ⓜ KIC Metrological Stations
⊙ DEP Stations
⊙ KIC Stations
* Relocated Station

The EPP areas are defined as follows:

- AREA A -contains heavy industry;
- AREA B -a buffer area surrounding industry, plus other outlying land zoned for industrial use; and
- AREA C -land used for predominantly rural and residential purposes.

Further information on any aspects of this brochure is available from:

KWINANA INDUSTRIES COUNCIL

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

165 Gilmore Avenue Kwinana Western Australia 6167
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The Kwinana Air Quality Monitoring Network

Development of the Kwinana Industrial Area began in the mid 1950's and today Kwinana is a major heavy industrial precinct located next to Cockburn Sound 15 kilometres south of Fremantle and covering an area of land approximately 2 kilometres wide and 12 kilometres long.

A common question is "How do air quality guidelines compare with other industries in Australia and around the world?" The answer is 'very favourably' - in fact air quality standards in Kwinana are comparable to World Health Organisation guidelines and more stringent than in Victoria and in the United States of America.

Table 1: Comparison of air quality standards for sulphur dioxide (SO_2)

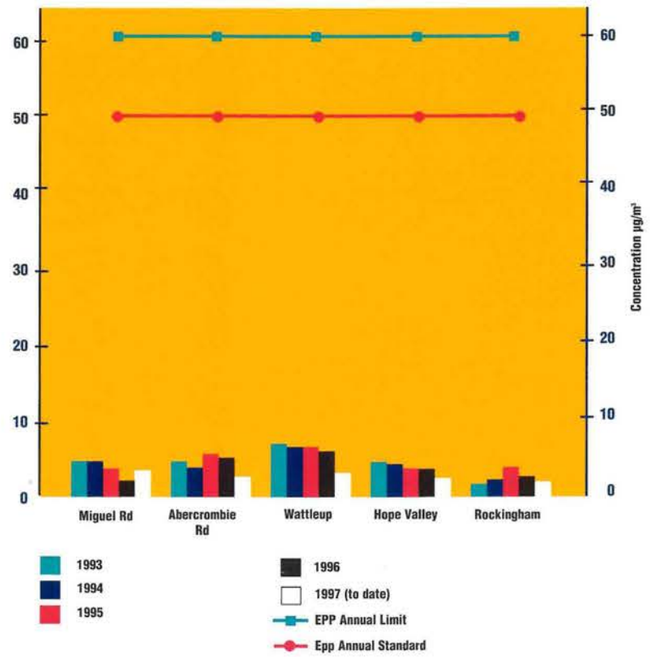
	Kwinana Environmental Protection Policy	Australian and New Zealand Environment & Conservation Council (ANZECC) and National Health and Medical Research Council (NHMRC) goals	Victorian Environmental Protection Authority (EPA) limits	Word Health Organisation (WHO) guidelines	United States Environmental Protection Authority (EPA) standard
Hourly average	*350-700 µg/m³	570 µg/m³	484-969 µg/m³	350 µg/m³	--
Daily average	125-200 µg/m³	--	171-313 µg/m³	125 µg/m³	365 µg/m³
Annual standard	50-60 µg/m³	60 µg/m³	--	50 µg/m³	80 µg/m³

*Standard - limit

In 1991 the Kwinana Industries Council (KIC) was formed to better unify and co-ordinate the interaction between industry and the community. KIC joined with the Department of Environmental Protection to monitor air quality in the Kwinana/Rockingham region. The Kwinana Industries and the Department of Environmental Protection (DEP) share a commitment to provide a high level of protection for the environment to ensure the health and safety of employees and the general community.

Together they have established an Air Quality Monitoring Network to monitor sulphur dioxide levels - the best yardstick for measuring air quality. The network includes six monitoring stations located at Wattleup, Hope Valley, North Rockingham, Abercrombie Road (Postans), Miguel Road (Bibra Lake), and Munster.

Results from DEP/KIC Air Quality Monitoring Network
Annual Average SO_2 Concentration

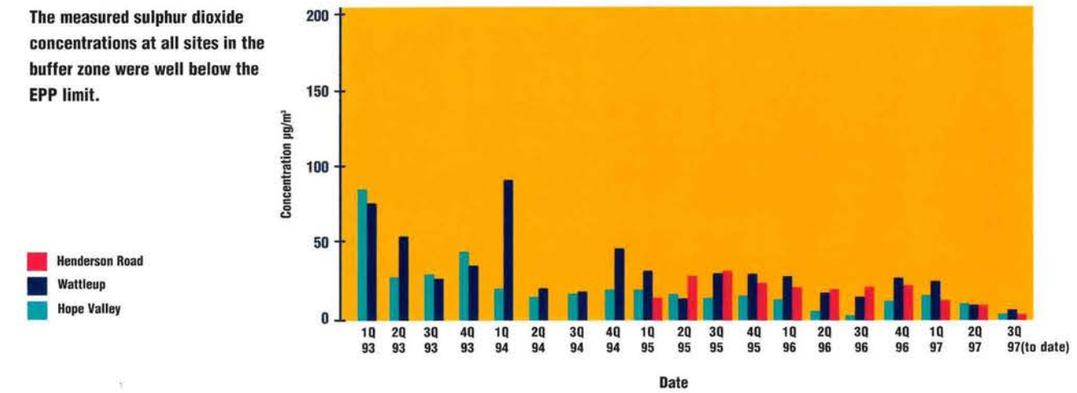


KIC invests more than $150 000 each year for continued operation of the network. In addition, individual companies continuously monitor stack emissions and report results to the DEP.

Results show that the EPP annual limit of 60 micrograms per cubic metre has never been exceeded from January 1993 (when the monitoring network started operating). In fact annual sulphur dioxide concentrations at the monitoring stations have ranged from 2.0 to 7.3 micrograms per cubic metre - well below the EPP annual standard of 50 micrograms per cubic metre.

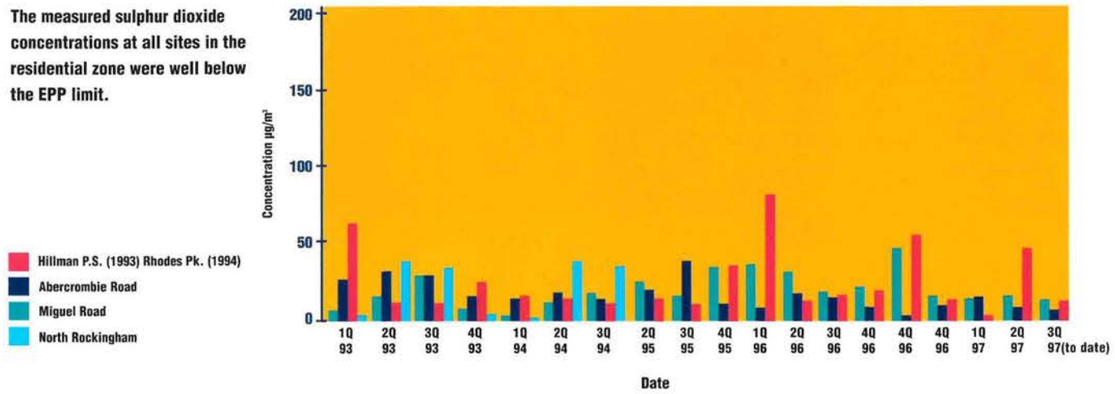
Maximum 24 hour SO_2 Concentration at Area B (Buffer Area)

The measured sulphur dioxide concentrations at all sites in the buffer zone were well below the EPP limit.



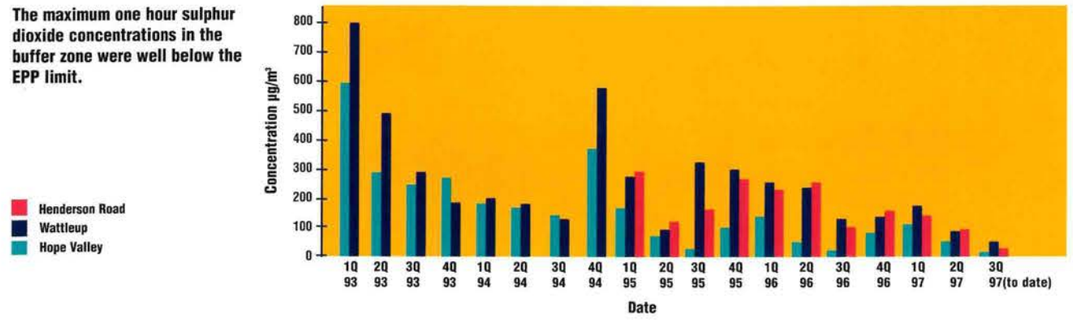
Maximum 24 Hour Concentration Residential Zone

The measured sulphur dioxide concentrations at all sites in the residential zone were well below the EPP limit.



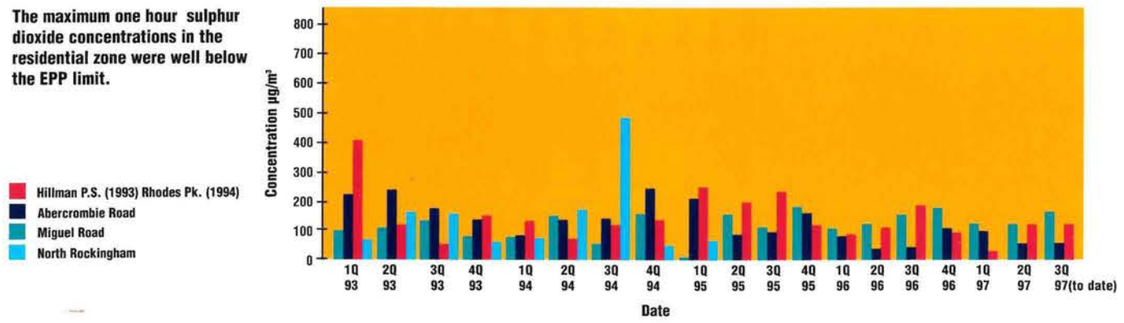
1 Hr Concentration - Buffer Zone

The maximum one hour sulphur dioxide concentrations in the buffer zone were well below the EPP limit.



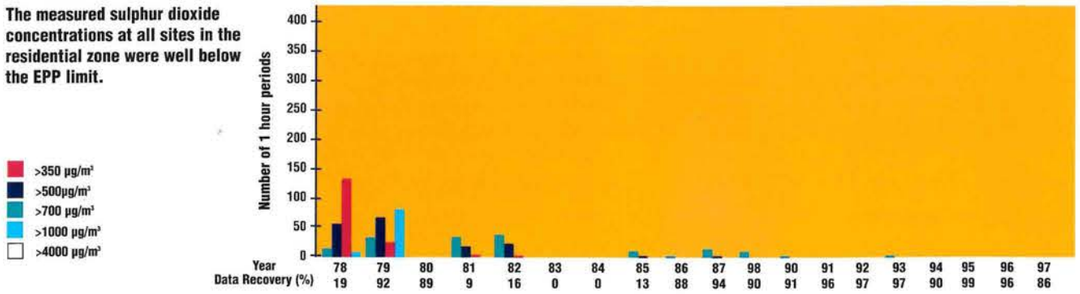
1 Hour Concentration - Residential Zone

The maximum one hour sulphur dioxide concentrations in the residential zone were well below the EPP limit.



Number of times the 1-hr Average SO_2 Concentration Exceeded the Nominated Value at the Wattleup

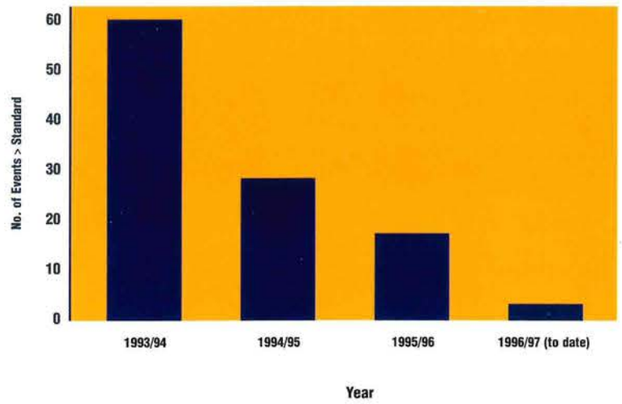
The measured sulphur dioxide concentrations at all sites in the residential zone were well below the EPP limit.



Prior to the industry using natural gas as its main fuel source there were many hours during the year when the measured sulphur dioxide concentrations at Wattleup exceeded the current EPP standard and on a few occasions exceeded the current EPP limit. In the mid to late 1980's the measured sulphur dioxide concentrations at Wattleup were much improved during the late 1970's and early 1980's but there were still several hours recorded in each year which were above the EPP standard. The improvement from 1990 was largely due to BP Refinery Kwinana commissioning its first Sulphur Recovery Unit. Since 1993 there have been no measured sulphur dioxide concentrations above the EPP limit and only two hours above the EPP standard.

Industry has and will continue to reduce sulphur dioxide, oxides of nitrogen and dust emissions through the introduction of new technology and process improvements. Some recent initiatives are detailed as follows:

Reduction in the Number of Dust Emission Events Exceeding the Standard at Alcoa



Alcoa's Kwinana Residue Storage Area Dust Management Programme has reduced the dust emissions by more than 90 per cent over the past four years as shown in the following graph. This was achieved by:

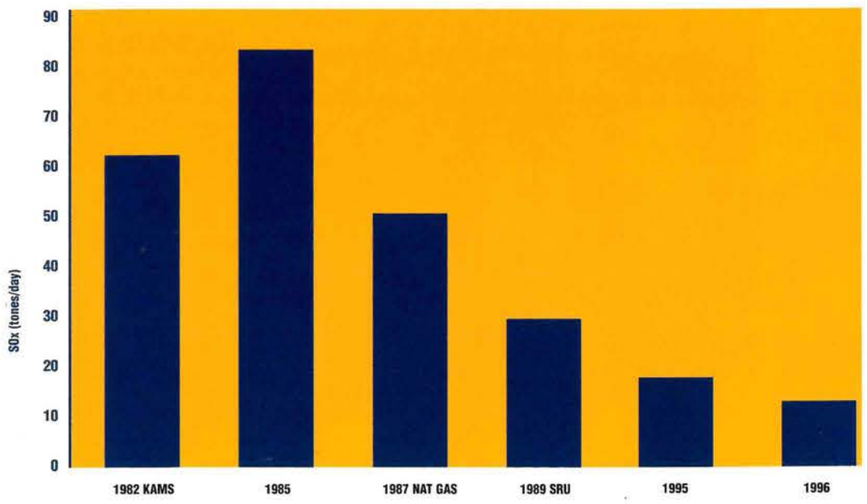
- expanding and upgrading the sprinkler network.
- the extensive use of vegetation and soil stabilising agents on exposed areas.
- the development and implementation of an ISO 14001 certified environmental management system.
- the establishment of a residue dust management team and empowerment of operating personnel to manage dust control activities on a day to day basis.
- implementation of a new mud drying strategy

BP's Kwinana Refinery has cut sulphur dioxide emissions to less than a quarter of their previous level over the past decade.

This is as a result of a variety of measures, including:

- switching to natural gas as an energy source in 1987, replacing fuel oil that contained sulphur compounds. This change reduced BP's sulphur dioxide emissions by 25 per cent.
- Commissioning two Sulphur Recovery Units (SRU) the first in 1989 and the second in 1992. These units remove sulphur from refinery fuel gas resulting in the reduction of emissions by as much as 70 per cent depending on the type of crude oil being processed.
- Sulphur Dioxide (SO_2) is produced when refining crude oil containing sulphur compounds.

Reduction in the Sulphur Dioxide Emissions from BP Kwinana Refinery

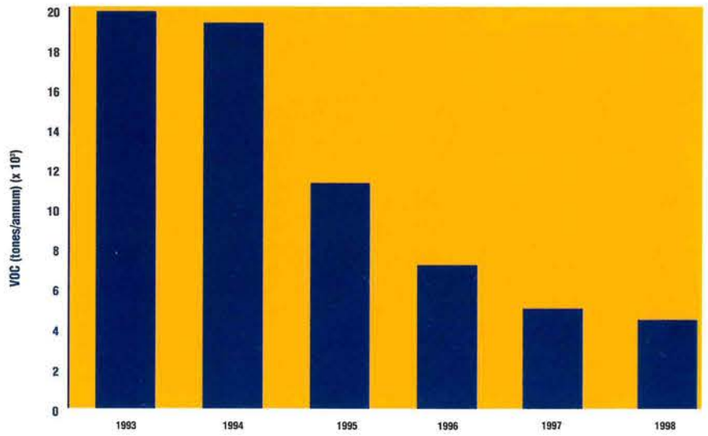


BP tackles odours

Located 70 meters above the ground, BP Refinery's flare has been specially designed to burn gases and sulphur compounds efficiently to reduce emissions.

Odour from hydrocarbons and mercaptans, used to give liquid petroleum gas (LPG) its distinctive smell, has sometimes caused community concern. BP installed a new 'stenching' facility in 1986 to reduce mercaptan emissions when LPG is being stenched. Secondary seals are now being installed on all floating roof tanks to reduce evaporation and odours.

Reduction in Volatile Organic Compounds Emissions from BP Kwinana Refinery



BP reduces Volatile Organic Compound (VOC) emissions.

BP's Kwinana Refinery was a significant contributor to the VOCs emitted into the Perth airshed, particularly during summer.

In 1995 BP started a VOC Reduction Programme to reduce emissions to one-quarter of 1994 levels by the end of 1998. The reductions will be achieved through capital investment in the best available technology and via process improvement.

The strategy is working - in the programme's first year there was a 38 per cent reduction in VOC emissions. The refinery is on track to meet its 1998 targets.

CSBP's new $69 million ammonium nitrate facilities.

In April 1996, CSBP commissioned new $69 million ammonium nitrate production facilities. These facilities comprise a nitric acid plant integrated with an ammonium nitrate solution plant.

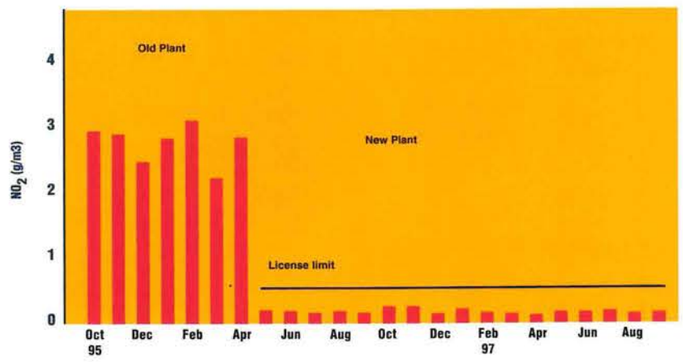
Since being commissioned, the nitric acid plant has produced a world-class environmental performance, cutting oxides of nitrogen (NOx) emissions more than 90 per cent. This has removed a visible yellow-brown plume from the Kwinana skyline. Emissions are continuously monitored.

AGR/CSBP - $15 million sodium cyanide plant upgrade.

A $15 million upgrade to Australian Gold Reagents' Kwinana sodium cyanide plant (operated by CSBP on behalf of the 70 per cent owned joint venture company) has cut oxides of nitrogen (NOx) emissions to about a quarter of their previous level.

The project involved the installation of a new high efficiency incinerator that converts unreacted ammonia in the waste gas stream to inert nitrogen and water vapour with very low NOx concentrations.

1 Hour Average NO_x Emissions from CSBP



Western Power - funded Photochemical Smog Study

The $3 million Perth Photochemical Smog Study was concluded after more than three years' study of Perth's atmospheric emissions and their interaction with local weather patterns to form photochemical smog. The study was initiated and funded by Western Power Corporation and carried out in conjunction with the Department of Environmental Protection.

As part of the study, a network of air quality monitoring stations was established stretching from Rottnest island to Rolling Green (near Toodyay) and from Two Rocks to Rockingham. These measured for the first time the frequency and extent of photochemical smog. This information, combined with details of winds, temperatures and amounts of emissions from all sources, enabled the development of computer models of the region's air and air pollution processes.

The outcome was an understanding of the fundamentals of the air pollution process in Perth and a tool for predicting regional effects of emissions to the air. While this is useful for industry, it is more important as a foundation for the general development and monitoring of air quality management strategies for the Perth community.

At the conclusion of the study, monitoring equipment and computer models established were handed over to the Department of Environmental Protection, who continue to use them and enhance them in the tracking of Perth's air quality.

LIVING CITIES – AIR TOXICS PROGRAM

The Commonwealth's new (3 year, $50 million) *Living Cities* initiative has been established to focus on urban pollution issues. One of the core elements of *Living Cities* is the Air Toxics Program, which has as its overall objective the development of a national strategy to "*monitor, establish the levels of community exposure to, and manage emissions of selected air toxics*".

The Air Toxics Program is the Government's second stage response to the independent inquiry into Urban Air Pollution in Australia (the first stage response "Clear the Air" was released in May 1998). The Air Toxics Program has been allocated $5 million over three years from 1999-2000 to support the development of a national strategy for air toxics.

The State of Environment Report (1996) defined air toxics as 'pollutants present at very low concentrations, known to cause or suspected of causing long-term health effects in humans'.

The air toxics strategy will monitor, establish the levels of community exposure to, and manage emissions of selected air toxics. Consideration will be given to the inclusion of air toxics in a future National Environment Protection Measure. Outcomes of the Air Toxics Program in 1999-2000 will include:

- the development of a 'state of knowledge report' relating to air toxics in Australia;
- commissioning of a number of studies to fill the information gaps identified by the 'state of knowledge report'; and
- the identification of a priority list of air toxics.

To initiate discussion on the objectives and scope of the Air Toxics Program, Environment Australia hosted an Air Toxics Forum (26 May 1999, Canberra). The Forum engaged State and Territory Governments and key stakeholder non-government organisations (NGOs) in a dialogue on issues relating to the identification and management of air toxics and indoor air quality. The Forum considered and achieved consensus on a number of issues including:

- a draft definition for 'air toxics';
- identification of a starting list of 105 air toxics;
- support for the development of a state of knowledge report on air toxics to facilitate the identification of priority areas of concern; and
- support for the establishment of a technical advisory group and a steering group to facilitate consultation and further progress on the air toxics issue.

Environment Australia has recently prepared an *"State of Knowledge Report on Air Toxics and Indoor Air Quality – Preliminary Draft"(SoK)*. The preparation of this report is a core element of the Air Toxics program implementation strategy. In preparing this report, Environment Australia considered various documents, including:

- *"Hazardous Air Pollutants - A Review of Studies Performed in Australia and New Zealand"*; Victorian Environment Protection Authority

Environment Australia
Department of the Environment and Heritage

(partially funded by the Australian and New Zealand Environment and Conservation Council; June 1999); and

- *'National Air Toxics Program – The Integrated Urban Strategy'* US EPA (July 1999)

This preliminary draft of the SoK is not intended to be presented to the public as the definitive statement on air toxics. Rather, it will openly invite the public to identify issues of concern, the preferred level of information required and to assist in identifying and/or supplying relevant data for consideration in the final SoK report.

Following a public consultation period, the draft report will be used to identify management options for air toxics.

The SoK report is likely to be released for public comment on 10 December 1999. Whilst there is a relative short period for public submissions proposed in the first instance (i.e. comments will be due by 31 January 2000), the report clearly identifies that Environment Australia will continue to receive and consider public submissions until early June 2000 when the comment period for the final draft of the SoK closes.

Environment Australia plans to release two further drafts of the SoK before the final print. A 'first draft' at the end of February 2000 and a 'final draft' mid May 2000. As is noted in the preliminary draft, the latest copies of the SoK will be available for downloading from the air toxics website (http://www.environment.gov.au/airtoxics).

In line with the outcomes of the Air Toxics Forum, Environment Australia has recently established two consultative groups, a Technical Advisory Group which will deal predominantly with the technical issues relevant to the program, and a smaller Steering Group to address broader policy issues. Both groups will report to Environment Australia, with core decisions on policy issues taken at Ministerial level. The first meetings of both these groups will be held on 16 December 1999 in Canberra.

An initial focus of the Steering Group and Technical Advisory Group will be on finalising the SoK report and the development and application of Australian specific criteria for identifying priority air toxics and industry sources.

As part of air toxics public education program, an Air Toxics webpage is being created on the portfolio website "Environment Australia Online". It will contain technical documents, details of meetings and links to other relevant sites.

For further information please contact:

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e-mail: airtoxics@ea.gov.au

(December 1999 update)