



## Welcome

Tunnels, risk and demolition! Welcome to the third edition of the AWN newsletter, in which we have included articles about road tunnel projects, the Geelong Cement stack demolition and a concrete crushing plant air quality impact assessment. As well as keeping AWN busy, these projects provide an interesting window into the many facets of air quality issues in environmental management.

Diversity in the air quality field was also highlighted at the recent Clean Air Society of Australia and New Zealand (CASANZ) Conference. The 17<sup>th</sup> International CASANZ Conference was held in Hobart, Tasmania and was attended by all AWN Team Leaders. Frank Fler played an active role at the conference, presenting at the pre-conference odour and indoor air workshops as well as chairing the conference plenary session on air pollution and climate change. Additionally, Frank Fler with Len Ferrari, presented a paper entitled "Three City Study on Indoor Air Quality in Australian Homes Using Unflued Gas Heaters – Final Report". For further details of the paper, please contact Sue Hicks by email at [awn@awn.com.au](mailto:awn@awn.com.au).

## AWN – The Industrial Air Quality Specialists

- Frank Fler:** Environmental auditing and odour
- Mark Tulau:** Source emission testing, NPI and modelling
- Anthony Myszka:** Ambient air quality monitoring
- Jacinda Houston:** Indoor air quality and risk assessment

More information, including a range of case studies, can be found on the recently updated AWN website: [www.awn.com.au](http://www.awn.com.au)

## Risk Assessment

AWN recently completed a series of risk assessments relating to emissions to air from the Geelong Refinery. The risk assessments, prepared for Shell Refining Australia, examined the risks associated with benzene and sulphur dioxide emissions to air.



Modelling predictions – benzene isopleths

Risk assessment is defined as the identification and quantification of risk resulting from an activity. The AWN prepared risk assessments included a comprehensive analysis of Australian and international human health based criteria as well as a commentary about each contaminant. Plume dispersion modelling results were used in the assessments as was ambient air quality monitoring data. Overall risk was assessed through comparison with standards and guidelines, health criteria and monitoring data from similar localities in Australia and overseas.

## In This Issue

Welcome	1
Risk Assessment	1
Road Tunnels	2
Delta Demolitions	3
Alcoa Wagerup – Independent Audit	3
Geelong Cement	4
Terminals Clean Air Award	4

## Road Tunnels

Road tunnels are the flavour of the past decade in Australia. AWN has been extremely busy in this area, with a range of projects conducted for Melbourne's City Link Tunnels and Sydney's Cross City Tunnel and Lane Cove Tunnel.

Projects associated with the Melbourne City Link project have included:

- Mathematical modelling of the dispersal of Domain tunnel ventilation stack emissions to assess the impact of the plume on proposed high rise residential developments in the immediate vicinity;
- Ambient air quality monitoring programme to establish baseline PM<sub>10</sub>, lead and TSP concentrations prior to the commencement of City Link construction activities;
- Statutory audits of ambient, tunnel and ventilation stack air quality monitoring systems. Assessment against best practice and NATA requirements, in accordance with EPAV licence requirements;
- Conduct of reference method measurements of velocity, temperature and NO<sub>x</sub> and CO concentrations, to establish correlations with outputs from continuous monitoring instruments installed on the Domain and Burnley ventilation stacks;
- Conduct of PM<sub>10</sub> and PM<sub>2.5</sub> ventilation stack emission tests and establishment of correlations with TEOM continuous monitoring systems installed in the Domain and Burnley tunnel ventilation system plenum chambers;

- Conduct of benzene and lead emission tests on the Domain and Burnley ventilation stacks;
- Assessment of airborne asbestos dust and noise exposure of tunnel maintenance workers.



Cross City Tunnel Ventilation Stack

AWN has recently commenced a contract to conduct six monthly statutory audits of ambient air quality monitoring associated with the Cross City Tunnel in Sydney. The audit protocol is to assess against best practice and NATA requirements, in accordance with Planning Minister Approval requirements. During the Cross City Tunnel project design phase, AWN conducted a buffer volume mathematical modelling analysis of ventilation stack emissions to determine an appropriate building height control overlay.

As part of the initial phase of the Lane Cove Tunnel project, AWN was commissioned to conduct an assessment of possible ambient air quality monitoring station sites, against the requirements of various Australian Standards and industry best practice.

AWN also has an exclusive agreement with Rowan Williams Davies & Irwin (RWDI, Canada) for the provision of wind tunnel monitoring services in the air quality field. RWDI has conducted a number of wind tunnel studies associated with road tunnels, including the Boston Central Artery/Third Harbour Tunnel project, to assess the impact of ventilation stack and portal emissions.



Ambient Air Quality Monitoring Station with the Sydney skyline in the background

## Delta Demolitions

Concrete crushing and recycling facilities provide necessary services to reduce waste to landfill and provide recycled material for road construction, however their impact on the environment and community needs to be assessed to provide adequate environmental and health protection.

Potential impacts arise from the release of airborne contaminants from the crushing and handling operations. Contaminants released from such activities include PM<sub>10</sub>, PM<sub>2.5</sub> and respirable crystalline silica ( $\alpha$ -quartz)

Mathematical modelling is then used to assess environmental impacts and associated health risks.

Before modelling can be carried out, an accurate emission rate from the crushing plant is required.

AWN Consultants were commissioned to assess the emission rate of particulate matter and crystalline silica from the crushing facility. A dichotomous sampler was used to simultaneously measure the PM<sub>10</sub> and PM<sub>2.5</sub> fractions of the airborne particulate matter. A Grimm® laser light scattering instrument was co-located with the dichotomous sampler to provide real time continuous measurements.



Air quality monitoring instrumentation adjacent to crushed concrete stockpile.

Samplers were located approximately 20 m down wind from the plant and immediately adjacent to the stockpile. Meteorological equipment continuously monitored wind direction and speed during the sampling period. The gravimetric results obtained from the dichotomous sampler were used to correlate the data from the Grimm®.

Crystalline silica content of the PM<sub>2.5</sub> fraction was determined by a dichotomous sampler by conducting sampling close to the source, where elevated particulate matter concentrations were present and in a laboratory trial utilising a fluidised bed. The higher particulate matter concentrations provide a lower limit of detection for percentage crystalline silica.

## Alcoa Wagerup - Independent Audit

AWN Consultants conducted an independent audit of the Alcoa World Alumina Australia, Wagerup Refinery, on behalf of the Department of Environmental Protection.



The audit objectives were as follows:

- Review of the methods used in establishing baseline and current odour emission levels, representative of production rates of 2.2 million tonnes per annum (mtpa) and 2.35 mtpa, respectively;
- Review of all six monthly and annual air quality monitoring reports submitted by Alcoa over the licence period;
- Review of the ambient air quality monitoring programme covering TSP, PM<sub>10</sub>, PM<sub>2.5</sub>, ozone and NO<sub>x</sub>;
- Review of the Liquor Burning facility metals emission tests;
- Review of the emissions inventory; including the monitoring plan, parameters to be measured, sampling method, analysis, reporting and interpretation.

Audit objectives were met with over 100 recommendations resulting. Public consultation was conducted with the audit outcomes well received.

## Geelong Cement

One of the more unusual projects conducted by AWN in recent times involved the demolition of some very large stacks.

In June 2001 the Geelong Cement plant closed. A subdivision was subsequently proposed by Moltoni Corporation following site remediation. One of the final remediation activities was the demolition of three concrete stacks, of approximately 100 m in height. ERM coordinated environmental management activities on behalf of Moltoni Corporation.

AWN Consultants was commissioned by ERM to conduct an ambient air quality monitoring programme, with the objective of assessing the contribution demolition activities made to PM<sub>10</sub> concentrations in the immediate vicinity.

***“Comments I received from air quality people within ERM and from EPA Victoria were that it was one of the best air quality reports they had seen.”***

A number of high volume samplers, equipped with size selective inlets, were located at various positions adjacent to the site boundary, enabling the environmental impact of demolition to be measured, irrespective of wind direction.

The stack demolition attracted a large amount of media and public attention and resulted in a substantial plume of dust, significantly increasing PM<sub>10</sub> concentrations downwind.

Mr. Troy Powell, ERM's Project Manager, said of AWN's report that “comments I received from air quality people within ERM and from EPA Victoria were that it was one of the best air quality reports they had seen”.



***High volume samplers equipped with size selective inlets were used to assess ambient air quality***



Destruction of Geelong Cement Stacks

## Terminals Clean Air Award

Terminals Pty. Ltd. was presented with the 2004 Werner Strauss Award from the Victorian Branch of the Clean Air Society Australia New Zealand (CASANZ). The award was granted in recognition of Terminals “continued investment in technology to reduce emissions and improve air quality”.

The award was presented to Terminals Managing Director, George Horman who noted that the “award was a welcome recognition of the range of measures undertaken since 1996.” Particular thanks were extended to a range of key players including, Terminals staff, AWN Consultants, EPA and community groups.

## MORE INFO

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