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**Pacific  
Environment  
Limited**

Specialist Consulting  
& Technology



# *Our Future Depends On Us*

Pacific Environment Limited (PEL) is uniquely positioned at the intersection of environment, energy and technology.

PEL companies' specialist services and technology products expertly address the needs of our clients in a corporate environment of increasing regulatory, financial and social pressures.

PEL's services and technologies help to create a sustainable future.

Our company is grounded on three guiding principles that propel it to excellence in the services and products that it delivers: knowledge, empathy and capability.



## PAE-Holmes

PAE-Holmes merges two of Australia's most respected and experienced consultancies in air quality and applied meteorology: Pacific Air & Environment (PAE) and Holmes Air Sciences.

PAE-Holmes delivers solid, reliable expert advice on environmental issues that are often sensitive and high-profile: air quality, odour and environmental noise.

The team has outstanding experience in the industrial, mining, infrastructure and transport, agricultural and government sectors.

Climate change is a key focus. In concert with other PEL companies and partners, PAE-Holmes' Emissions Management Team helps clients with their legal reporting obligations on greenhouse gas emissions and energy usage. It finds more cost-effective ways of balancing environmental, energy and economic imperatives related to climate change.

## Toxikos

Toxikos specialises in understanding the nature of exposure and effects of chemicals to people and the environment. For example, it provides the critical end-point assessments of environmental impact studies: will communities and/or organisms be adversely affected by air and water emissions?

Toxikos has a reputation for thoroughly researched, objective assessments of toxicological effects, both in the environment and the workplace. The company has been consulted on many complex, high-profile projects where experience and authority are necessary, including many cases involving litigation.

The company's service offering is built on international credibility and long experience within industry, academia, government and consulting. The result: an outstanding toxicological consultancy with few peers.

## newEQ

newEQ is a company dedicated to quality services in emissions, odour and air quality measurement. Measurement lies at the source of all environmental data and newEQ's work therefore is fundamental to clients' needs as well as many of the other services provided by PEL companies.

With clients across Australia and overseas, newEQ has a philosophy dedicated to best practice, which gives its clients assurance that they are receiving the right information.

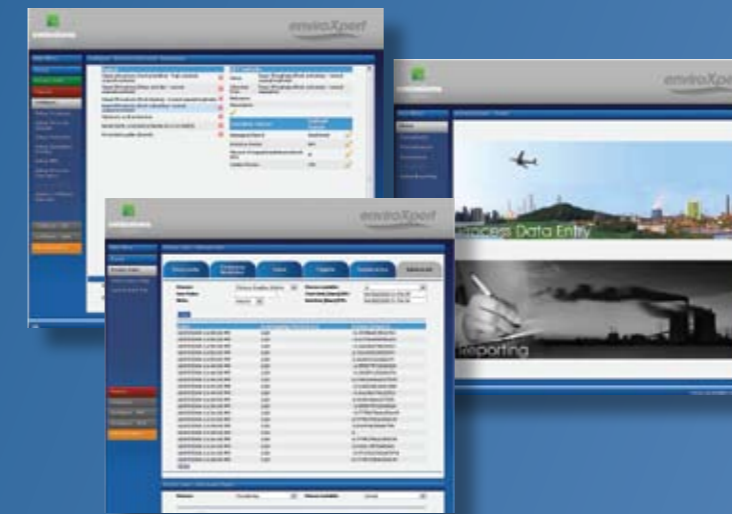
newEQ's stack testing services benefit from regular training in the USA, where the highest of standards are set. Within PEL, newEQ also benefits from the direct advice of data end-users in PAE-Holmes and Toxikos, the result being a service that is even more driven to satisfying client needs.

Apart from the testing and analysis of criteria pollutants and air toxics, newEQ operates an odour laboratory compliant with ANZS 4323.3:2001.

## PEL Technologies

### emissionsXpert

- Full Emissions inventory, register for federal, state and local reporting
- Containing over 2000 pollutants and over 600 commonly used and approved EET's from Australia, USA and Europe.
- Intuitive data entry – Automatic via FTP/CSV, web services or manual
- Web Based



### plumeXpert

- Air Quality Incident and Complaint Management
- Forecasting and Scenario Modelling
- Real time dispersion modelling
- Emissions Tracking
- Plume Analysis



## Services

- Climate Change & Energy
- Air Quality & Meteorology
- Odour Management
- Environmental Noise
- Toxicology & OHS
- Water & Wastewater
- Enviro Technology
- Real-time Environmental Management
- Energy Management Systems
- NPI & NGER Reporting
- Environmental Policy & Strategy
- Expert Testimony
- Training & Education
- GIS

## Technologies

PEL's suite of technologies complements the group's expertise and focuses on real-time and web-based environmental and energy management systems.

With demands on companies for improved responsiveness and accountability, PEL's technologies provide efficiency gains and vastly improved management capabilities. For example:

**emissionsXpert** is an emissions inventory and estimation system that streamlines reporting for NPI, NGER, regulatory compliance and internal purposes, with attention to detail accuracy and functionality

**plumeXpert** is a real-time system that enables highly efficient investigation of dust, odour and noise complaints, with instant reports. Forecasts of weather, plume dispersion and sound propagation allow pro-active management to avoid or minimise impacts ahead of time.





## Wind Event Forecasting for Dust Emissions Management

Pacific Environment Limited companies developed predictive schemes that have enabled our clients to predict dust events and customise their operations accordingly.

This capability is a massive benefit for operations where dust is a problem.

By assessing a range of data including meteorological data, rainfall and evaporation information, as well as synoptic charts and comparing these with monitored particle data from a site, a set of correlations can be developed to assist in predicting dust events. Lag and instantaneous correlations are evaluated. The predictability of wind-generated dust events using best available predictors over various lead times can be identified and algorithms can be developed to predict occurrence of adverse events.

When these events are predicted to an acceptable degree of probability, operations have a certain period of time to take appropriate action to mitigate dust events.



## Ongoing technical support for air quality management

Pacific Environment Limited provides ongoing technical support to clients on all facets of air quality management. Our expertise and in-depth experience plus our understanding of regulations ensure our services and reports are robust and able to withstand the most rigorous scrutiny.

Our air quality assessments include the following:

- Air plans – conducting comprehensive air emissions inventory and air quality impact assessments.
- Emission limits modelling – predicting maximum emission limits to meet regulatory air criteria.
- Load Based Licensing (LBL) - reviewing and validating emission estimation techniques to air for process units (for NSW clients).
- Major upgrade/process improvement assessments – assessing air quality impact for proposed process upgrades involving large capital expenditure.
- Mitigation options – advising on pollution mitigation options.
- Installation of ambient air monitoring stations – modelling studies to support location of ambient monitoring stations.
- Odour incident investigations – modelling and field assessment of odour incidents impacting on nearby communities.



## Regional Emissions Inventory Development

With our skills in emission estimation protocols, database management and our in-depth knowledge of emission sources, Pacific Environment Limited companies are perfectly positioned to help all levels of government develop large-scale regional emissions inventories. Emissions inventories allow organisations to assess the level and nature of pollutants in their area of responsibility in order to implement policies to reduce and manage these emissions. The end result is a cleaner and safer environment.

Some of the recent work we have performed in this area includes:

- The Greater NSW Metropolitan Region air emissions inventory which encompassed over 500 pollutants across 7,000 industrial and commercial facilities
- The SE Queensland emission inventory for commercial, industrial and area-based sources
- The national dioxin emissions inventory for industrial and mobile sources.



## Assisting industry to report to the National Pollutant Inventory (NPI)

PAE, a Pacific Environment Limited company, was at the forefront of the development of the National Pollutant Inventory (NPI). We drafted the original Emission Estimation Technique (EET) Manuals for many industries and have updated many more on behalf of the Commonwealth Government and industry representative bodies. Since the NPI's inception, PAE has provided technical services to an extensive range of industry sectors, assisting them to meet their reporting requirements.

Our proven ability in emissions inventory and emissions estimation work ensures the best approach is used in each situation and enables our clients to achieve NPI reporting requirements with greater ease, more consistency and more confidence every year.

Our NPI services for clients include:

- assessing reporting thresholds for the 93 NPI substances and developing emission estimation techniques for those that are reportable
- developing emissions estimation software tools, which enable consistent and easy NPI reporting from year to year
- providing contextual information for emissions from various industries, which enables the general public to assess NPI emissions data in context
- estimating emissions and providing annual NPI reports for compliance with NPI reporting.



## Independent expert advice to Planning NSW

Hunter Valley coal mining industry

Robin Ormerod and Dr Peter D'Abreton of PAE were chosen by the NSW Department of Planning as two of the very few highly trained and objective experts to conduct independent assessments relating to air quality and greenhouse gas impacts of the Mt Arthur North, Ashton and Anvil Hill coal mines and the Kooragang Island coal loader proposals.

PAE was commissioned to review assessments prepared by the proponents, submissions from the public and to hear submissions in a public sitting of a panel of independent experts. The final deliverables were the provision of comprehensive reports and expert evidence for the Minister to make the final decision.



## Peer review - air quality impact assessment, plume rise and smog formation studies

As a result of our reputation for delivering quality work, Pacific Environment Limited companies are often approached to conduct external peer review of studies completed by other consultants. Specifically, we provide expert review for emissions estimation protocols, air quality impact assessments, including plume rise assessments where required by the Civil Aviation Safety Authority (CASA) and photochemical smog formation assessments.

Reports are reviewed with regard to technical accuracy and validity. Consideration is given to issues such as: the validity and precision of the input data, appropriateness of the tools used for the task, methodology and analysis of results. Reports are checked to ensure the relevant guideline documents are adhered to and that the methodologies and data used are acceptable and sufficiently conservative to allow for modelling uncertainties.

Item Name	TOXIC SUBSTANCES		
		Reporting period:	
Process Data	Pollutant	Usage (kg)	Emissions (kg)
Records	1,1,2,2-TETRACHLOROETHANE		CH 5
Configure	1,1,2,2-TETRACHLOROETHANE		CH 5
Configure - NPI	1,2-DICHLOROETHANE		CH 5
Reporting Methods	1,2-DICHLOROETHANE		CH 5
Facility Details	2,4-DICHLOROPHTHALATE (TDI)		CH 5
Contact Details	2-ETHOXYETHANOL (CELLULOSE) (ESEE)		CH 5
Emission Sources	2-ETHOXYETHYL ACETATE (CELLULOSE ACETATE)		CH 5
Reported Pollutants	2-NITROETHANOL (METHYLCELLULOSE) (NME)		CH 5
Material Handling	4,4-DIMETHYLENE BIS (2-CHLOROPHTHALATE) (MDC)		CH 5
Fuel Combustion	ACETALDEHYDE		CH 5
	ACETIC ACID		CH 5
Traps	ACETONE		CH 5
View NPI Report	ACETONITRILE		CH 5

## Multi-site emissions estimation and compliance reporting software

Suitable for all industries

Emissions estimation and smart technology solutions are major strengths of Pacific Environment Limited. Our multi-site emission estimation and reporting software greatly simplifies the task of calculating and reporting emissions. In this important area, we have helped clients across a wide range of industry sectors such as metals, chemicals and electricity generation, and across many different processes including mining, refining and fertiliser manufacturing. Our emissions estimation and reporting capability ensures data integrity, consistency and easy storage across multiple sites. Information produced is tailored to satisfy requirements of the National Pollutant Inventory (NPI), reporting, greenhouse gas estimates or annual environmental returns. Additionally the multi-site approach to emissions estimation is useful for internal emissions analysis since consistency in estimation methodologies and reporting style is achieved across all sites.



## Advanced odour and dust emissions characterisation and assessment techniques

Intensive livestock operations

Pacific Environment Limited companies have been leading consulting in odour and dust assessment for the intensive livestock industry for decades. We have conducted hundreds of studies and provided expert testimony in legal cases on behalf of many clients in the poultry, cattle and pig farming industries. Our impact assessments are based on emissions characterisation which incorporates analysis of meteorological factors and farm management practices, as well as our evaluation tools such as field odour surveys and dispersion modelling. Our comprehensive assessment approach enables our clients to implement effective separation distances in order to avoid odour nuisance at sensitive neighbouring receptors. Based on our depth of experience, we have developed models for estimating odour emissions from intensive livestock operations and provided best practice advice to industry bodies including the Rural Industries Research and Development Corporation (RIRDC), Australian Pork Limited (APL) and Meat & Livestock Australia (MLA).



## Climate Change Management

Re-engineering the economy to environmental imperatives: this is what climate change management really means.

PEL's climate scientists, environmental engineers, planners, risk analysts and IT specialists are the people to shoulder the task. PEL is your expert guiding hand through the climate change maze.

PEL services and technologies equip our clients to readily understand their carbon footprints, how to reduce them cost-effectively, how to prepare for emissions trading and move to a sustainable future.

PEL's suite of climate change services and products includes real-time emissions and energy measurement, automated mandatory reporting for NGER and EEO, energy auditing and management, designing alternative energy systems and planning to reduce climate-related environmental risk to business, government and the broader community.



## Best practice guidance on plume dispersion modelling

Pacific Air & Environment (PAE) provided the Australian Alumina Industry with best practice guidance on the selection and application of models to simulate and predict the impact of air emissions.

Our expert advice included a comprehensive review of dispersion modelling including information on model options, model uncertainty and limitations and recommendations as to the most appropriate dispersion model to use for various applications. We also advised on validation procedures, results reporting and the status and relevance of air dispersion models looking toward the future.

By using PAE's best practice modelling guidelines, the Australian Alumina Industry is in a position to achieve regulatory approval in the best way possible. Their approach is now robust and secure against external critique from peer reviewers, regulators and key stakeholders. It also takes account of the pace of development in new modelling approaches and is unlikely to be questioned within a five year timeframe.

## Education and Growth

PEL's philosophy holds that in a complex world with growing demands on skills, expert capability needs to be complemented by, and embodied in, innovative technologies. The result is improved business efficiency and better environmental outcomes.

An essential driver of sustainability is continuing growth of the knowledge and experience that nourishes our services and products, which in turn gives our clients and the wider world a better chance to succeed against the many environmental challenges that confront us.

As a company with a future focus and a belief that science and engineering are necessary to a sustainable future, PEL is committed to an educational program, not only within the group but also engaging with the outside world. With this commitment, PEL looks to a future of growing opportunity and relevance.



“Our aim is to create a company providing world class environmental services to clients and a stimulating collaborative environment for our talented staff”