An independent review commissioned by the Australian Government Department of the Environment and Energy of Australia’s Fuel Quality Standards Act 2000 (the Act) has found that the improvements in fuel quality that have been achieved since the introduction of the Act have helped to reduce vehicle emissions released into metropolitan airsheds, resulting in significant environmental and health benefits. The Act provides the legislative framework for national fuel quality standards in Australia, and is primarily aimed at reducing the human health impacts of air pollution, as well as reducing greenhouse gas emissions associated with the combustion of transport fuels.

The Australian Government has announced that it will retain and amend the legislation. A range of amendments to the Act and the associated Fuel Quality Standards Regulations 2001 have been proposed as part of the independent review, such as:

- Enhance consumer protection provisions to ensure that the fuel supplied does not contain any contaminants that affect engine operability.
- Increase the legislative review period from five years to 10 years.
- Streamline the process for establishing new fuel blends, such as biofuel products.
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- Develop a ‘racing fuel’ standard for use in certain motor racing and water sports.
- Strengthen penalties, compliance and reporting provisions.
- Improve coordination with emission standards regulated as Australian design rules (ADRS) under the Motor Vehicle Standards Act 1989.

The Australian Government has also announced that it will conduct a review of the individual fuel standards that have been made under the Act. At this stage it is unclear if this will align the fuel quality standards in Australia with international best practice, with the independent review recommending that no decision should be made in this regard until further cost-benefit analysis has been undertaken.

The independent review has also focused attention on the complex relationship between ozone and nitrogen dioxide (NO₂), with studies demonstrating that the reduction in NO₂ through improved fuel quality standards is contributing to increased ozone production, particularly in the Sydney airshed.

Ramboll Environ has previously reported on this, for standard setting in the US. For example in Downey et al. (2014) Ramboll Environ looked at emission reductions and ozone response and found that as emissions are reduced from 100 percent to zero, the distribution of ozone concentrations narrows toward the background concentration (i.e., peak ozone decreases but low ozone increases). Consequently, exposure reduces more slowly than expected as emissions are decreased.

Photochemical models are required to evaluate the impacts of ozone upon air quality within major metropolitan areas. Ramboll Environ has developed and actively maintains one of the two models used by USEPA to develop air quality regulations for ozone and PM (USEPA, 2011). The Comprehensive Air Quality Model with extensions (CAMx) (ENVIRON, 2015) is a Eulerian photochemical dispersion model that allows for integrated ‘one-atmosphere’ assessments of gaseous and particulate air pollution over a wide range of spatial scales ranging from suburban to continental. CAMx is a publicly available, open-source computer modelling system that can be downloaded from the CAMx home page.

Further information regarding the review of Australia’s fuel quality standards legislation can be found on the Department of the Environment and Energy website or by contacting our senior air quality specialists: Karla Hinkley (08 9225 5199) in Perth, and Ronan Kellaghan (02 9954 8100) in Sydney.

Notes:

UPDATE: AUSTRALIAN REGULATORY DEVELOPMENTS IN PER- AND POLYFLUOROALKYL SUBSTANCES

Australia Update previously reported on regulatory developments in Australia related to per- and polyfluoroalkyl substances (PFAS). PFAS compounds are of concern due to their persistence, tendency to bioaccumulate, high biological oxygen demand (BOD) potential, and acute and chronic toxicity. Since our last edition, further regulatory developments have occurred in Victoria, Queensland, New South Wales and nationally through enHealth.

The enHealth June 2016 Statement included interim health reference values for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS) for tolerable daily intake, drinking water guidelines and recreational water quality guidelines. These interim values will be replaced by relevant reference values to be published by Food Standards Australia New Zealand in the future.

The Victorian EPA released a publication in August 2016 indicating that it is adopting draft standards for PFOS and PFOA that have been fast-tracked as part of the review of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality. The draft standards are the first.
ever Australian standards for aquatic ecosystem protection and while they will become part of statutory policy in 2018 they are recommended for immediate use.

New South Wales EPA released an Addendum to the Waste Classification Guidelines in October 2016, which provides specific contaminant concentrations (SCC) and leachable concentrations using toxicity characteristics leaching procedure (TCLP) for the most common PFAS compounds, allowing for the classification of PFAS containing waste as general solid waste, restricted solid waste or hazardous waste. SCC and TCLP values are available for PFOA and combined PFOA + PFHxS.

Queensland Department of Environment and Heritage Management released Policy Explanatory Notes on the environmental management of fire-fighting foams in August 2016. These Policy Explanatory Notes are extensive and include an assessment of the impacts of fire-fighting foams, treatment and disposal of wastes, foam use issues, assessment standards and policy implementation requirements in Queensland. It also includes information regarding the complexity of the chemistry of fluorinated organic compounds. The Policy Explanatory Notes indicates there are hundreds to thousands of possible fluorinated organic compounds, with only approximately 170 of those in use in fire-fighting foams having been currently publicly identified. Analytical laboratories can identify up to 28 of these currently known compounds. There are also precursor compounds, which transform to a perfluorinated end-point compound via biodegradation (i.e., PFOA, PFOS, PFHxS precursors). This provides a challenge to site owners, regulators and environmental consultants, as fire-fighting foams can be advertised as ‘PFOS and PFOA free’ but contain PFOA precursors that will transform via partial degradation in the environment to PFOA.

Environmental laboratories are now offering Total Oxidisable Precursor Assay to identify precursor compounds. This analysis involves incubation of water samples or sample extracts (soil and water) with potassium persulfate and sodium hydroxide for six hours at an elevated temperature and then neutralised and analysed for the full suite of PFAS compounds. The identification of precursor compounds is important for understanding potential biodegradation products at a site. Ramboll Environ has extensive experience in undertaking assessments of PFAS compounds in air, soil, surface water, groundwater, wildlife, livestock, produce and consumer articles. Our global experience includes:

- Derivation of PFOA and PFOS surface water site-specific Tier 1 screening criteria that is protective of human health and ecological receptors for a site in Australia.
- Evaluation of human health and ecological risks at a number of airports around Australia with PFOS and PFOA identified in groundwater, soil, concrete, sediment, pore water, surface water and aquatic biota, due to the historical use of aqueous fire-fighting foam. The migration of PFOS and PFOA into nearby waterways was also assessed which considered the bioaccumulation of PFOS and PFOA in aquatic organisms.
- Development of short- and long-range fate and transport models to evaluate potential concentrations of PFASs in air, soil, surface water, groundwater, produce, livestock, fish and wildlife from potential sources of release into the environment. Our work was reviewed by a panel of independent experts in the area of exposure and risk assessment, and summarised in two separate articles, one on atmospheric transport and the other on food chain modelling, co-authored with DuPont scientists and published in the peer-reviewed journal Environmental Science & Technology.
- Development of an exposure model used to estimate exposures of adults, children, infants and environmental receptors to estimated and measured PFAS concentrations in various environmental media.
- Assessment of exposures to PFASs that may be present as a trace reaction by-product or production residual in a range of consumer articles manufactured or treated with fluorinated materials (including carpeting, clothing, upholstery, non-woven medical garments, architectural fabrics, non-stick cookware, high-performance hose and tubing, cable and wire insulating layers).
- Evaluation of data on measured concentrations of PFOA, PFOS and other PFASs in human blood, wildlife and fish tissue, groundwater and other environmental media.

For further information on PFASs, contact Belinda Goldsworthy or Kirsty Greenfield (02 4962 5444).
MANAGING ENVIRONMENTAL COMPLIANCE: LESSONS LEARNED FROM MAJOR CONSTRUCTION PROJECTS

Managing environmental compliance on a major project is complex and must begin before environmental regulatory approvals are sought and granted. Environmental compliance should be considered early in project delivery and the environment and approvals team must be comprehensively integrated into every project discipline.

Interface between project approvals and practical construction experience

Developing the compliance management strategy as early as possible and integrating practical, construction risk-based experience into the project approval process will reduce risk and potential costs which could result from committing to unachievable obligations. Too often a practicality review is left until after project approvals have been obtained, leading to expensive and unnecessary project commitments. Schedule delays, design re-work and contractor cost variations are common when there is not a strong interface between the implementation-experienced approvals team and the design/construction teams.

Integrating environmental expectations into the procurement process

The most effective way for clients to minimise a project’s environmental risk and cost is through performance of contractors and sub-contractors. Integrating practical, risk-based environmental expectations into the procurement process, including contract documentation and evaluation for major contracts, such as engineering, procurement and construction (EPC) or engineering, procurement and construction management (EPCM) contracts, allows clients to ensure that all compliance commitments (legislative and corporate) are cascaded down to their contractors and sub-contractors before contracts have been signed. Including these expectations in the competitive tender stage ensures that the project owner can dictate how much risk to take or pass on to the contractor. This also reduces the risk of post-contract variation costs to the client.

Development of effective compliance systems

The number of environmental incidents during project construction often peaks at the beginning and the end of project construction. The latter is typically due to the early demobilisation of experienced people, while the former results from the commencement of construction with inexperienced personnel and undeveloped systems and processes to manage compliance.

An environmental compliance system should be developed early in the project lifecycle, preferably alongside the approvals process prior to construction. Often a management system is not developed and, if it is, only just before or as construction commences. The demands of a new construction site inevitably result in the development of ineffective systems as the focus of the team turns to the activity on site. Developing the system earlier allows the environment team to more effectively support contractors and sub-contractors to prepare for the site work and ensure that the team ‘hits the ground running’ when construction begins.

The Ramboll Environ team has extensive experience scoping, pricing and delivering environmental requirements for major projects to minimise cost and schedule delays, reduce the risk of non-conformance and ensure that leading practice is applied in a practical manner.

Our senior staff have provided:

• Project approval phase: strategic advice, management of approvals process, coordination of baseline studies and preparation of environmental impact assessment (EIS) reports
• Pre-tender support to the project owner: develop the environmental compliance strategy and contract documentation for the delivery phase tender

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CUMULATIVE AIR QUALITY IMPACTS IN AUSTRALIA

The assessment and management of cumulative air quality impacts can present a challenge for many regions. Australia’s national standards for airborne particles have become more stringent, with the variation to the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM) coming into force earlier in the year. Naturally elevated background levels of airborne particles occur seasonally within the arid regions. The data required to simulate cumulative air quality impacts from existing (and approved) regional emission sources is typically not readily available. There is no consistency across jurisdictions or guidance on a recommended approach for cumulative impact assessment.

Ramboll Environ was recently commissioned by the NSW Environment Protection Authority (EPA) to review and evaluate approaches to cumulative air impact assessment and recommend suitable assessment methodologies for implementation. The review was prompted by a number of challenges faced in NSW, including spatial and temporal gaps in background data, evaluation of short-term cumulative impacts, climate effects and the influence of inter-annual variability on background concentrations, dealing with elevated background concentrations and treatment of local and distant emissions sources.

Methodology review included recent air quality impact assessments, guidance documentation and regulatory frameworks for air quality management in other jurisdictions. A questionnaire was also distributed to senior personnel in Ramboll Environ’s global air practice to seek feedback on how challenges faced in NSW have been addressed elsewhere.

Suitable methodologies were identified and evaluated in a matrix, based on criteria, including broad application, objectiveness, conservativeness, consistency and suitability for implementation in NSW. One of the outcomes of the review identified that challenges faced in NSW are common to many other jurisdictions, and have not necessarily been resolved. Nevertheless, common themes were identified in the jurisdictional review, some of which have been used to develop a proposed framework for cumulative air impact assessment in NSW.

The full report can be viewed here.

For further information please contact our senior air quality specialists, Karla Hinkley (08 9225 5199) in Perth and Ronan Kellaghan (02 9954 8100) in Sydney.
Ronan Kellaghan presented at the Waste Management Association of Australia (WMMa) Conference on Energy from Waste (25–27 October 2016). Ronan’s presentation discussed emissions from waste to energy (WtE) facilities and some common myths and misconceptions. Drawing on our extensive experience in Europe, Ronan presented case studies to demonstrate that WtE facilities have been operating for decades in Europe, close to residential areas and with minimal risk to the public. Our experts have been owner’s engineer on more than 145 facilities in 45 countries, including two facilities in Australia – in NSW and Western Australia.

For more information, contact Ronan Kellaghan (02 9954 8100).

Low-carbon and climate-resilient infrastructure in Xiangtan, China

Building on technical assistance methodologies provided by our experts in six pilot cities in the Asia-Pacific region, we have been awarded an engagement with the Asian Development Bank covering Xiangtan City in China. The Xiangtan project will identify the vulnerability of the city’s critical infrastructure under future scenarios of climate change, and fill knowledge gaps regarding city-level investment needs and appropriate financing mechanisms for low-carbon, climate-resilient infrastructure.

The six pilot cities

For the six pilot cities, we are conducting workshops to map climate vulnerability and validate the identified options in each of the cities. These sessions bring together high-ranking city officials, academics, utility managers and other project teams to work collaboratively to address the challenges and opportunities presented by climate change. New software has been trialed to integrate technology platforms which are critical to enabling engagement in cities where data is scarce. The ultimate aim is to identify which projects, or components of projects, could be eligible for climate financing from donor agencies, development banks or the private sector. Pilot city analysis will be extrapolated to all cities within ADB developing member countries which have a population greater than 750,000 and a growth rate exceeding 30 percent by 2030. More than 100 cities in the Asia-Pacific region meet this criteria.

The Xiangtan project

The Xiangtan ADB project represents a significant opportunity to engage in China’s recent expansion of the Low Carbon Pilot Cities initiative which initially began with eight cities in 2010 and now encompasses 100 cities throughout the nation. The initiative requires cities to produce comprehensive strategies to peak carbon emissions before 2030 through prioritising projects based on each city’s circumstances. The Low Carbon Cities will develop citywide greenhouse gas emission inventories, set measurable reduction targets, develop low-carbon action plans, and establish tracking mechanisms. This programme is in addition to other climate change projects in China, such as:

- The Sponge Cities initiative, which aims to mitigate flood risks through blue-green infrastructure and allow at least 20 percent of a city’s urban area to absorb 70 percent of rainfall by 2020.
- The recently launched Urban Adaptation to Climate Change Action Plan, which initially will be piloted in 30 Chinese cities and consider urban vulnerability to the impacts of climate change.

For more information, contact Stella Whittaker (02 9954 8102).

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