Laboratories and research facilities
Bioprocess & Controlled Environments
Senior Management

Joe Gangi
Managing Director
Bioprocess & Controlled Environments, Australia and South East Asia

Darren Green
Technical Director
Bioprocess & Controlled Environments, Australia and South East Asia

Frederic Jeunet
General Manager
Bioprocess & Controlled Environments, Australia

Nenad Firez
Business Development Manager
Bioprocess & Controlled Environments, Australia
Tel: +61 (0) 400 495 885
Email: nenad.firez@amec.com
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AMEC is a focused supplier of consultancy, engineering and project management services to its customers in the world’s oil and gas, minerals and metals, clean energy, environment and infrastructure markets. AMEC designs, delivers and maintains strategic and complex assets for its customers.

AMEC’s businesses employ over 29,000 people in more than 40 countries globally. AMEC shares are traded on the London Stock Exchange. The company has a strong reputation for operational excellence, and combining global excellence with local delivery.

In 2011, AMEC and Zektin Engineering combined strengths to improve delivery for our customers by offering combined expertise, wider global coverage and increased scale within the bioprocess and controlled environment sectors within Australia and South East Asia.

AMEC’s Bioprocess & Controlled Environments (BCE) business operates from Australia and China and services a wide variety of related industries:

- **Bioprocess**
  - Biotechnology and pharmaceutical
  - Laboratories and research facilities
  - Food and beverage
  - Biofuels
- **Renewables**
  - Biomass / Bioenergy
  - Solar
  - Wind
- **Industrial / Commercial**
  - Advanced manufacturing / Heavy Industrial
  - Waste treatment and emissions control
  - Energy efficiency and optimisation
- **Government Services / Defence**
**Beyond Zero**

AMEC’s vision is to achieve sustainable, world class Health, Safety, Security and Environmental (HSSE) performance excellence throughout our global operations.

The AMEC Beyond Zero program aims to create an HSSE culture where strong leadership, personal responsibility and an unyielding commitment to excellence are cornerstones of how we conduct our business. We consistently take HSSE performance beyond the work place and out into the wider community.

Engagement at various levels within the organisation provides an opportunity to influence safety behaviour and create a culture of HSSE commitment greater than self-interest. AMEC has developed engagement tools to support this process, taking our HSSE performance ‘Beyond Zero’.

> "I believe real leadership can only be demonstrated by setting personal standards that capture the hearts and minds of our people, thereby encouraging the right attitudes and behaviours throughout the organisation."

**Neil Bruce**, Chief Operating Officer
AMEC Natural Resources
AMEC’s project delivery is based on a proven gate system that ensures the deliverables are appropriate to the relevant project phase.

This system is well aligned with our clients’ requirements for funding approvals and improves our clients’ risk management profile due to our experience with and understanding of all phases of asset life cycles. This knowledge enables our clients to achieve their business objectives by confidently making decisions that provide optimal solutions for profit and sustainability.

From our successful execution of laboratory projects for various clients we know that the cornerstone of success is alignment with the end users drivers and the ability to address and incorporate these early in the project life. To do this as specialist laboratory designers we will:

- Ensure a thorough understanding of the nature of the facility requirements associated with the science
- Adopt an open minded approach, challenging convention and looking for proven innovative solutions via value improvement
- Ensure fit for purpose design
- Deliver practical design - Incorporation of constructability, operability and maintainability
- Deliver designs that fully consider the science risks and are optimised to offer flexible and reliable solutions
- Offer a complete delivery approach to see projects through from design and procurement to construction assistance and commissioning support, ensuring regulatory compliance requirements are met throughout the project life.
AMEC is a focused supplier of high value consultancy, engineering and architectural services to the world’s Bioprocess & Controlled Environment and industries.”
AMEC offers a multi-disciplined engineering design team, which includes Mechanical, Chemical, Process, Electrical, Instrumentation and Automation Engineers, and associated drafting support.

Our engineers are skilled in providing design in compliance with a wide range of regulatory bodies and codes, relevant to our industries of specialisation.

The knowledge base gained from our widely varying range of speciality projects brings to our clients a source of design solutions that provide innovative and cost effective outcomes.

Our aim is to fully understand our clients’ scope, cost, time and quality requirements, and ensure that our assigned personnel have the experience and resources necessary to exceed our clients’ expectations. Our focus is to deliver a fully co-ordinated, process driven design with strong emphasis on compliance and safety.

AMEC’s scope of services span the entire asset life cycle from Phase 1 (Feasibility Study) through to Phase 5 (Operation).

We utilise best industry practices in all areas of our business, providing the following service range to our clients:

- Project management (incl. capital cost estimation, cost control and planning)
- Site infrastructure development strategies and planning
- Building services
- Feasibility and conceptual studies
- Schematic design
- Detailed design (2D or 3D modelling)
- Process design / production modelling
- Project risk analysis
- HAZOP Studies, SIL reviews & safety management studies
- Plant layout
- Tender documentation
- EPCM services.

### Engineering delivery model

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<thead>
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<tr>
<td><strong>Feasibility study</strong></td>
<td><strong>Concept design</strong></td>
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| - User brief  
- Concept options  
- Feasibility analysis  
- Modelling  
- Execution strategy  
- Value assessment | - Project verification plan  
- User requirements specification  
- Concept design documentation  
- Design criteria  
- Site selection  
- Cost planning  
- HAZOP 1 | - Functional specification  
- Schematic design documentation  
- Design basis  
- Planning documentation  
- Cost estimating  
- HAZOP 2  
- Risk assessments / safety reviews | - Design specification  
- Design qualification  
- Detailed design documentation  
- Authorities approval  
- Cost estimating  
- HAZOP 3  
- Risk assessments / safety reviews  
- Tender evaluation / review  
- Construction supervision / assistance  
- FAT / SAT  
- Commissioning  
- Installation verification / operational verification / performance verification | - Operational assistance  
- Process optimisation  
- SOP’s  
- O&M manuals  
- Value assessment |
### Architecture

AMEC is committed to delivering truly exceptional professional design services which are tailored to the specifics of our clients and their projects.

We deliver successful projects through extensive client collaboration from inception to occupation, co-ordinated multi-disciplined integrated design teams, and the implementation of comprehensive consultancy processes.

AMEC’s architectural design professionals approach projects with careful analysis, creative and technical skill, innovation, and proven design experience, ensuring project information is continually shared, coordinated and updated across our multi-disciplined teams.

### Services include the following:

- Design management, design co-ordination
- Strategic facility planning, Master planning
- Feasibility studies, brief formulation
- Schematic design
- Developed design
- Contract documentation
- Contract administration
- Post contract services
- Post occupancy evaluation
- 3D animation
- Interior design.

### Architectural delivery model

<table>
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<tr>
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<tr>
<td>Pre-design</td>
<td>Schematic design</td>
<td>Detailed Design</td>
<td>Contract documentation / tender / contract administration</td>
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</tr>
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- Brief preparation
- Feasibility studies
- Site analysis
- Space analysis
- Functional relationship diagrams
- Flow diagrams
- Block planning
- Masterplan.

- Site layout
- Schematic design
- Site development options
- Data sheets.

- Detailed design
- Town planning application
- Outline schedules of materials, finishes, colours & fixtures
- 3D modelling
- 3D animations.

- Working drawings
- Specification
- Schedule of materials / finishes / colours
- Building permit application
- Tender process & negotiations
- Contract administration.

- Defects liability period
- As-built documentation
- Post occupancy evaluation. 
Environmentally sustainable design services

AMEC offers a multi-disciplined and integrated approach to achieving ESD principles and Green Star Ratings to projects.

Sustainability is the base principle in our approach to delivery of projects. With our accredited GBCA Green Star Professionals, which include our Architectural, Process, Mechanical and Electrical disciplines, we deliver successful Green Star projects through extensive design team and client collaboration.

AMEC utilises best sustainable design practices in all areas of our business, providing the following service range to our clients:
- Life cycle cost analysis
- Energy efficient HVAC and building services systems using innovative design solutions
- Ecologically sustainable architectural design
- Water recycling and reuse solutions
- Integration of renewable energy solutions
- Waste treatment and waste products reuse
- Emissions control, Heat recovery systems.

Procurement and construction management

AMEC offers the following procurement and construction management services:

Procurement management
- Identification and approval of suitable contractors
- Development of tender packages and contract conditions
- Assessment and analysis of tender submissions
- Recommendation of tender offers
- Preparation of orders
- Expediting
- Assessment and approval of vendor data
- Inspections
- FAT / SAT.

These tasks can be carried out using AMEC’s proven systems or tailored to our clients’ preferred or existing systems:

Construction management
Construction management can be executed on behalf of our clients, or individual discipline support can also be provided where appropriate and can be in conjunction with client representatives or other service providers.

- Assistance during construction
- Site supervision
- Site management
- Contract management.

green building council australia
ACCREDITED PROFESSIONAL
Commissioning services

AMEC is widely experienced in the start up and commissioning of complex technical facilities and process systems.

Our inherent understanding of the way things work brings a thorough approach to commissioning, with the use of job specific methods and procedures, delivering safe and incident free start-up. This provides a high degree of confidence for plant operation and validation in regulatory controlled project environments.

Our commissioning services experience includes:
- Preparation of inspection and test plans
- Preparation of commissioning plans
- Preparation of commissioning procedures
- Commissioning management and direct supervision
- Plant start up and performance testing
- Commissioning documentation compilation
- Compliance documentation.
Compliance certification

AMEC is widely experienced in the compliance verification of laboratory facilities and services ensuring that the facility can obtain the necessary certification to operate.

Our experience and understanding of the various laboratory regulatory requirements for compliance, allows us to use job specific methods and procedures as well as client templates, where applicable. This approach provides a high degree of confidence that the specific regulatory requirements of a project will be met, and that regulatory approval will be simplified.

Verification or “documentary evidence” of the project’s critical aspects is of prime importance in projects for controlled regulatory environments such as OGTR, AQIS, NATA, SSBA, chemical weapons, HAZCHEM, EPA and TGA.

All compliance documentation are produced under a Project Verification Plan and are formatted in a manner that gives forward and backward traceability of critical aspects, in addition to defining specific roles and responsibilities throughout the project stages.

Our core compliance certification competencies include:
- Preparation of client user requirements/project brief
- Preparation of compliance matrix that shows which regulators/regulations apply to each laboratory areas
- Preparation of Project Verification Plan (based on the pharmaceutical industry validation “V” model), based on an agreed quality plan methodology
- Facilitation of compliance risk workshops with the users and design consultants to review the design solutions from the point of view of compliance with user needs, regulatory suitability and buildability/constructability

The pharmaceutical industry validation 'V' model

![Diagram of the pharmaceutical industry validation 'V' model]

- User Requirements
- Performance Verification
- Functional Requirements
- Operational Verification
- Design Requirements
- Installation Verification
AMEC is an AQIS accredited Third Party Assessor for Quarantine Approved Premisses for PC2/QC2 to PC4/QC4 containment facilities.

Client representative / peer reviews

- Preparation and execution of Installation Verification protocols to verify that the installed facility meets the approved design and regulatory requirements
- Preparation and execution of Operational Verification protocols to verify that the facility has been commissioned to operate reliably over the approved design range of controlled parameters and that regulatory requirements are met
- Preparation and execution of Performance Verification protocols to verify that systems are stable and robust in operational condition to satisfy relevant regulatory requirements
- Ensuring that design changes and site changes are documented in a manner that allows traceability of reasons and authorisation to facilitate compliance documentation approvals
- Compliance management.

AMEC has performed the role of peer reviewer or client representative on many projects. We understand the client needs and have a thorough approach in ensuring that client requirements are met in all aspects of the project, from safety to quality, compliance, budget, time and operability.

Our services at various project stages include:
- Representing the client during design, tender, construction and commissioning stages
- Performing design reviews/peer review
- Liaison with all stakeholders and development of user requirements
- Facilitating user brief meetings
- Chair compliance and regulatory committee meetings
- Project risk identification / assessments
- Performing / chairing / facilitating HAZOP studies and safety reviews
- Attending design meetings, review design team progress and schedule
- Assistance with contractor selection and tendering process
- Attending site to inspect and comment on construction works, samples and prototypes
- Performing independent site inspections and prepare defects list at critical milestones
- Reviewing builder’s construction documentation including as-built O&M manuals and commissioning documentation
- Reviewing builder’s quality plan for compliance requirements
- Assisting client in answering construction queries
- Witnessing critical commissioning tests for critical services.

"AMEC is an AQIS accredited Third Party Assessor for Quarantine Approved Premisses for PC2/QC2 to PC4/QC4 containment facilities.”
Laboratory capability

AMEC has successfully designed specialist laboratories and technology intensive facilities across a wide range of industries and research sectors. We deliver projects through extensive client collaboration, from inception to occupation, with a commitment to deliver building solutions and services design, tailored to meet end user needs and specific compliance requirements.

Our core competencies in design and compliance services include:

- Biological containment laboratories (microbiology, animals, plants and invertebrates) PC1 [BSL1] to PC4 [BSL4] (AQIS & OGTR certified)
- Biosecurity (SSBA), forensic testing laboratories
- Animal housing, quarantine and testing laboratories (PC/QC/BSL Rated and SPF)
- Clean - contained laboratories, including sterile and aseptic manufacturing facilities
- Controlled environment rooms, warm rooms, coolrooms, freezers, stability storage rooms (TGA & NATA certified)
- Microbiology and PCR laboratories
- Cell culture manufacturing facilities and laboratories
- Third party assessment for AQIS quarantine approved premises up to QC4 containment level
- Wet and dry chemical laboratories
- QA/QC laboratories
- Cytotoxic/steroids facilities
- GMP facilities
- Hazardous, toxic and pyrophoric gas laboratories
- Pilot plants for manufacturing, technology proof of concept and clinical trials
- Physical test, radiation and electronics laboratories
- Laser, electron microscopy, nano fabrication and speciality instrument laboratories
- Material sciences, plastics, metals and fibres laboratories
- Online QC laboratories for fuel research
- Photo voltaic R&D and microelectronic component assembly laboratories
- Painting and welding laboratories

Some of our specific design and compliance certification expertise in specialist laboratory services include:

- Architectural and building services (HVAC, electrical, instrumentation & controls, hydraulics)
- Laboratory gases (argon, helium, hydrogen, ethylene oxide, carbon dioxide, oxygen, breathing air, compressed air, acetylene, silane)
- Laboratory water (filtered water, purified water, water for injection)
- Waste treatment (biological liquid waste, chemical waste, toxic waste)
- Process vacuum
- Chemicals and solvents handling and reticulation
- Hazardous and flammable goods handling and storage
- Cryogenic systems
- Stringent environmental conditions control (temperature, humidity, pressure, particles)
- Ventilation and fume extraction
- Dust, vapour and emissions control, odour control, scrubbers
- Fumigation systems
- Explosion proof facilities
- Specialist utilities (pure steam, glycol chilled water, UPS).
AMEC is experienced in plant operation and development of documentation, for operations and ongoing compliance.”
Relevant experience

Clients

- Australian Government Department of Health and Ageing
- Australian Red Cross Blood Services
- Biosciences Research Centre
- Biota
- Box Hill TAFE
- BTI A*Star (Singapore)
- Central Public Health (PNG)
- Chisholm Institute
- CSIRO
- CSL Ltd
- Deakin University
- Department of Agriculture, Fisheries and Forestry (DAFF)
- Department of Employment, Economic Development and Innovation
- Department of Primary Industries
- Donor Tissue Bank of Victoria
- Elizabeth MacArthur Agricultural Institute
- Hunter Medical Research Institute
- Hunter New England Health
- James Cook University
- King Mongkut’s University of Technology (Thailand)
- Latrobe University
- Ludwig Institute for Cancer Research
- Major Projects Victoria
- Melbourne Health
- Monash University
- Murdoch Children’s Research Institute
- Northern Territory Department of Construction and Innovation
- Orica
- Olivia Newton John Cancer Centre
- Pasteur Institute (Vietnam)
- Peter Doherty Institute
- Pfizer Animal Health
- Queensland Government Project Services
- Royal Adelaide Hospital
- RMIT University
- South Australian Health and Medical Research Institute (SAHMRI)
- Swinburne University
- The University of Melbourne
- University of Newcastle
- Victoria University
- Victorian Comprehensive Cancer Centre (VCCC)
- Victorian Infectious Diseases Reference Laboratories
- Walter and Eliza Hall Institute (WEHI)
- WHO Influenza Collaborative Research Centre
- World Health Organisation
CSL required a modern and consolidated QA/QC testing laboratory facility where samples from various expanding R&D and manufacturing departments could be submitted and tested. The laboratory facility performs testing on finished products, in-process / stability / R&D / validation samples, raw materials, reagents, media and chemicals in the areas of sterility, virology, bacteriology, environmental monitoring, immunochemistry and chemistry. The key objectives which the facility had to deliver were, compliance with TGA, FDA and cGLP, refurbishment and upgrade of existing building, improved sample, material and equipment flows, and increased testing capacity.

**Key Functional Areas**
- Chemistry labs
- Immunology labs
- Bacteriology labs
- Virology labs
- Sterility labs
- Samples receipt
- Personnel Airlocks (PAL)
- Lab support / prep rooms
- Freezer, cold and warm room
- Dangerous goods stores (fire rated)
- Offices, meeting rooms and canteen.

**AMEC Services**
- Project management
- Design management
- Process engineering design
- Mechanical engineering design

**Project Outcomes**
FDA registration for the labs, equipment and testing processes obtained. High grade labs of increased capacity, efficient use of space and improved flow of samples, materials and equipment. Labs contain new and reused lab equipment, isolators, BSCs, LIMS / BPCS points, autoclaves, purpose built lab joinery, safety eye wash / showers and lab services such as natural gas, nitrous oxide, acetylene, nitrogen, argon, helium, hydrogen, carbon dioxide, DI water, PFW, vacuum and compressed air. Improved air quality within labs using filtered HVAC system and provision of segregation of testing operations to prevent sample contamination and protect operators. Facility security access for personnel and samples in accordance with GLP and FDA guidelines.
The new NSW & ACT Principal Site (NAPS) facility accommodates the New South Wales and ACT blood processing, testing and distribution operations and supporting management and administrative functions. This new facility allows the Australian Red Cross Blood Service (ARCBS) to combine blood collection storage, blood processing and testing operations, currently performed at a number of locations, into one operation at NAPS.

ARCBS brief was for a state of the art facility with the highest level of compliance. The blood processing and blood storage facility is fully validated and registered with the Therapeutics Goods Administration (TGA). The laboratories are designed to PC2 (BSL2) containment levels.

Further, the site has been classified as Importance Level 4 as defined in the Building Code of Australia and is able to continue to operate in island mode for 4 days in the event of a disaster in complete isolation from the city services (water, power, waste, sewer, fire water) without external support (maintenance or spare parts). Under circumstances of continued loss or unavailability of one or more essential services from the usual source of supply, the ARCBS facility must have the capability of delivering blood supplies to hospital and plasma manufacturing facilities on a continuous basis.

The functional areas of the 10,000 m² facility are as follows:

- Level 1: Warehouse, Blood storage (coolrooms and freezer rooms, Blood processing manufacturing (centrifuges, etc)
- Level 2: Plant rooms, canteen, staff amenities
- Level 3: PC2 (BSL2) laboratories, offices
- Level 4: PC2 (BSL2) laboratories including PCR rooms, offices

Scope of work

AMEC was engaged by the builder Buildcorp as the engineering services design consultant, responsible for the multidiscipline design of the mechanical (HVAC), electrical, controls and instrumentation, RO purified water, liquid nitrogen, steam, carbon dioxide and vacuum services for the new facility. Our role extended to assistance during construction and commissioning.

AMEC was also engaged as the validation coordinator responsible for the overall qualification documentation and execution.

Project Highlights

- Redundancy, reliability and energy efficiency design considerations to meet the island mode operations.
- 3D design to minimise coordination issues in limited plantroom space.
- Facility awarded with ‘2011 Best Health Facility valued $50 million-$75 million’ at the Master Builders Award NSW.
## Our selected project history

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<tr>
<td><strong>Victorian Comprehensive Cancer Centre - University of Melbourne / Vic Government / Royal Melbourne Hospital, Victoria</strong></td>
<td>AMEC was engaged to provide HVAC design services, multi-disciplinary compliance peer reviews (including architecture and building services) and accreditation consultancy services for this large multi-storey cancer research centre. The facility contains PC3 and QC2 clean contained laboratories as well as a large SPF Quarantine &amp; Research PC2/QC2 animal facility. Our role also included the creation and execution of verification testing protocols, to provide third party checking of facility systems and production of documentary evidence for regulatory submission to regulators such as AQIS, OGTR, TGA and NATA.</td>
</tr>
<tr>
<td><strong>University of Melbourne, Peter Doherty Institute, Victoria</strong></td>
<td>AMEC is acting as client technical and compliance advisor, reviewing the design response, assisting in the selection of contractors and providing technical review of construction activities as well as conducting peer review workshops identifying risks for the new multistorey SPF &amp; PC2 Animal Facility, PC2, PC3 and PC4 containment laboratories, including electron microscopy equipment. In addition AMEC is undertaking the production and execution of verification testing protocols to provide third party review of facility systems and to ensure that documentary evidence is produced for regulatory licence submissions to regulators such as AQIS, OGTR, NATA, Victoria Police and the like.</td>
</tr>
<tr>
<td><strong>RMIT University, MicroNano Research Facility (MNRF), Victoria</strong></td>
<td>AMEC was engaged as the client technical representative providing technical advice on architecture and engineering services design for the fitout of this high technology ISO5 cleanroom facility. The facility will include a full suite of photolithography equipment, wet processing facilities, polymer processing laboratories, thin film deposition and patterning equipment, micro- and nano-metrology capabilities, and support facilities for design and packaging. AMEC prepared a return brief and will assist RMIT with various tasks including: detailed client briefing, technical review of the design and tender documentation, assistance with research equipment selection &amp; specification and technical support during construction and commissioning.</td>
</tr>
<tr>
<td><strong>Australian Red Cross Blood Services, New South Wales</strong></td>
<td>AMEC was the lead designer for the blood service cleanroom blood processing facility and testing laboratories in Sydney. Multidiscipline design of the process, specialist laboratory services (including lab gases, liquid nitrogen, cryo storage, lab vacuum, purified water, blood storage refrigeration) and building services for the TGA and PC2 compliant facility. AMEC was also engaged as validation coordinator responsible for the overall qualification documentation and execution.</td>
</tr>
<tr>
<td><strong>Victorian Infectious Diseases Reference Laboratories, HIV PC3 Lab, Victoria</strong></td>
<td>AMEC Architecture &amp; Engineering were commissioned to provide full detailed design &amp; construction reviews for the upgrade and refit of this PC3 facility, including replacement of the Autoclave and connection of the PC3 waste to the existing PC4 sterilisation system within the existing footprint of the lab, and allowing for construction within the working lab complex.</td>
</tr>
<tr>
<td><strong>Elizabeth McArthur Agricultural Institute (EMAI), New South Wales</strong></td>
<td>AMEC completed the detailed design and acted as construction reviewer for this PC2 and PC3 biological research and response unit for the NSW state government. The facility includes animal, plant &amp; microbiological laboratories and a dedicated PC3 biological liquid waste treatment system.</td>
</tr>
<tr>
<td><strong>Hunter Medical Research Institute (HMRI), New South Wales</strong></td>
<td>AMEC was engaged as the detailed designer for the process, specialty services (including lab gases and lab water), building services and architectural fit-out for the multi-storey state-of-the-art PC2 medical research institute. The facility includes specialised animal facilities, medical research and training facilities, and innovative biotechnology and commercial research laboratories, including Microscope and precision balance laboratories.</td>
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<tr>
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<tr>
<td>Swinburne University, Advanced Manufacturing Centre, Pilot Plant and Nanotechnology lab, Victoria</td>
<td>AMEC have been engaged to perform a peer review of the design documentation for the project, including review of the module assembly rooms, integration rooms, coating rooms, acid etching rooms, specialty lab gases (ultra pure gases, silane) and gas abatement systems.</td>
</tr>
<tr>
<td>James Cook University, Tropical Biosecurity Centre, Queensland</td>
<td>AMEC provided a multidisciplinary peer review of the multi accredited PC2/3 OGTR 2/3 AQIS QC 2 facility, including Architecture, Mechanical services, Hydraulic Services, Electrical services and a high level review of fixed equipment. The 13M facility will be used for both training and biosecurity response. The facility will offer a high containment PC3 lab in North Queensland, enabling safe, rapid and accurate diagnosis of diseases which could have impacts on the local animal industries. The facility will be multi accredited to allow safe manipulation and diagnosis of Quarantine and Genetically Modified material.</td>
</tr>
<tr>
<td>Olivia Newton-John Cancer Centre, Victoria</td>
<td>AMEC were responsible for the hosting of risk review workshops that systematically reviewed the proposed concept design of the areas that will be occupied by the Ludwig Institute of Cancer Research. The Ludwig Institutes therapies rely on developing vaccines based on biological derivatives specifically focusing on treatments for Melanoma, Colon, Prostate, Bladder, Lung, Renal, Breast and GIoma cancers. The workshops were a systematic way of ensuring the facility meets the requirements of the users, can be registered for use with the appropriate regulatory bodies and can effectively function as a safe compliant facility. The Ludwig institute required PC 2 and PC 3 containment spaces as well as TGA classified clean rooms to Grade C certification.</td>
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<tr>
<td>Deakin University, PC2 animal holding facility, Victoria</td>
<td>AMEC was engaged for a detailed design of a new PC2 animal holding facility at Deakin University, Burwood Campus. The design was for architectural, electrical, mechanical, hydraulics and fire protection services. AMEC will also provide full construction administration services during construction.</td>
</tr>
<tr>
<td>Biota, Victoria</td>
<td>AMEC was engaged to review the existing conditions of Biota PC3 biological laboratories and design necessary upgrades for compliance to current standards. AMEC is also engaged to provide technical support during construction and commissioning.</td>
</tr>
<tr>
<td>The University of Melbourne, PC2 insectary, Victoria</td>
<td>AMEC was engaged to undertake a feasibility study and preliminary design for the conversion of a standard laboratory area in the Bio21 institute into a PC2 insectary for the Centre for Environmental Stress and Adaptation Research (CESAR).</td>
</tr>
<tr>
<td>Department of Primary Industries, Victoria</td>
<td>AMEC was engaged as lead consultant to provide for construction documentation and multi-disciplinary compliance peer reviews for the new QC2 Glasshouse.</td>
</tr>
<tr>
<td>Department of Agriculture, Fisheries and Forestry (DAFF), Australia</td>
<td>AMEC was engaged as lead consultant for the design and preparation of the scope of work documentation for the autoclave replacement projects at DAFF QC3 avian containment facilities in Spotswood (MC) and Torrens Island (SA).</td>
</tr>
<tr>
<td>Australian Red Cross Blood Services facility, Western Australia</td>
<td>AMEC was engaged for the detailed design of a refurbishment of the existing Blood Processing Centre and support laboratories in Perth. The design was for electrical, mechanical, hydraulics and fire protection services. AMEC will also provide full construction administration services during construction.</td>
</tr>
<tr>
<td>Hansen Yuncken and Leighton Contractors JV Royal Adelaide Hospital, South Australia</td>
<td>AMEC were engaged by the joint venture to provide specialist review advice of the TGA/GMP areas associated with the New Royal Adelaide Hospital. AMEC reviewed and provided specialist advice on the layouts and the URS documents provided for the project.</td>
</tr>
<tr>
<td>Department of Planning, Transport and Infrastructure, South Australia</td>
<td>AMEC was engaged as Compliance advisors to provide design documentation peer reviews, ongoing site inspections and a formal DAFF Biosecurity (AQIS) inspection of the South Australian Health and Medical Research Institute (SAHMRI) facility. The facility is to be used as a research hub and comprises multiple floors of PC2/QC2 research laboratories and animal facility. The SAHMRI facility also contains the Royal Adelaide Hospital Cyclotron.</td>
</tr>
<tr>
<td>Monash University, PC2/ QC2 laboratory, Victoria</td>
<td>AMEC was engaged to perform the technical review of architectural and engineering services design and tender documentation for the fitout of a PC2/QC2 laboratory for the incoming Head of Biological Sciences.</td>
</tr>
<tr>
<td>Department of Construction and Infrastructure, Northern Territory</td>
<td>AMEC were engaged by the Department of construction and infrastructure to undertake a design review of their new QC3 laboratory in Berrimah.</td>
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<tr>
<td>Department of Planning, Transport and Infrastructure, South Australia</td>
<td>AMEC was engaged to provide specialist laboratory design for the PC3 laboratory which will be used by SA Pathology to investigate and work with tuberculosis. The laboratory will be retrofitted into an existing diagnostic laboratory and will have the ability to work as an investigative bioterrorism laboratory if required.</td>
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<td>Donor Tissue Bank of Victoria, State Coronial Centre, Victoria</td>
<td>AMEC was engaged by John Holland as TGA accreditation consultant, providing technical advice to ensure compliance to GMP and cleanroom standards. Role included validation advice, review of contractors documentation, site inspections and assistance during construction and commissioning.</td>
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<tr>
<td>Department of Employment, Economic Development and Innovation, Queensland</td>
<td>AMEC was responsible for the design peer review and risk identification for the new fumigation chamber at the Ecosciences Precinct PC3 insect laboratory at Dutton Park.</td>
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<tr>
<td>Australian Red Cross Blood Services, Victoria</td>
<td>AMEC was engaged as the validation and compliance consultant for the blood service cleanroom blood processing facility and PC2 testing laboratories in Melbourne. AMEC was responsible for the overall qualification documentation and execution to TGA requirements.</td>
</tr>
<tr>
<td>Latrobe University / Department of Primary Industries, Biosciences Research Centre, Victoria</td>
<td>AMEC assisted in the scoping of the project, compilation of the brief and a reference design for the PPP delivery for this animal and plant sciences research facility that includes PC2 &amp; 3 large and small animal and plant facilities as well as PC2 &amp; PC3 microbiological laboratories. AMEC is retained by the State (Major Projects Victoria) to review and advise on compliance and assist in witnessing of commissioning on behalf of the LTU/DPI partnership.</td>
</tr>
<tr>
<td>Monash University, New Horizons, Victoria</td>
<td>AMEC performed and facilitated design risk reviews for facilities and services. The project consisted of PC2 research laboratories, PC2 animal facilities, PC2 glass houses and laser, x-rays and optical physical science laboratories, PC2 and animal facility as well as work areas for CSIRO Earth Sciences.</td>
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<tr>
<td>Victorian Infectious Diseases Reference Laboratories, Victoria</td>
<td>AMEC were commissioned to provide full detailed design &amp; construction reviews for the upgrade and refit of this PC4 facility's liquid waste and HVAC systems allowing for construction within the working lab complex.</td>
</tr>
<tr>
<td>CSIRO, Gas to Liquids Project, Western Australia</td>
<td>AMEC was engaged as a specialist design advisor for the Gas To Liquids Project for facility design aspects and hazardous area definition. The facility consisted of Fire Rated enclosures for Research Rigs, QC Laboratory, Afterburner room and Gas Bottle Storage.</td>
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<tr>
<td>CSIRO, Fibre and Textiles Relocation, Victoria</td>
<td>AMEC was engaged to provide specialist advice on equipment relocation and services requirements.</td>
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<tr>
<td>Pasteur Institute, Vietnam</td>
<td>AMEC was engaged to complete schematic design for a BSL-3 Laboratories Building to Australian, Canadian, United States and WHO guidelines and standards. The facility acts as Vietnam's major infectious diseases diagnostic and research centre for the emergence of new diseases such as SARS, H5N1, etc.</td>
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<td>Client</td>
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<tr>
<td>CSL Ltd, Victoria, QA/QC testing laboratory upgrade, Victoria</td>
<td>CSL required a modern and consolidated QA/QC testing laboratory facility where samples from various expanding R&amp;D and manufacturing departments could be submitted and tested. The laboratory facility performs testing on finished products, in-process/stability/R&amp;D/validation samples, raw materials, reagents, media and chemicals in the areas of sterility, virology, bacteriology, environmental monitoring, immunochemistry and chemistry. The key objectives which the facility had to deliver were, compliance with TGA, FDA and cGLP, refurbishment and upgrade of existing building, improved sample, material and equipment flows, and increased testing capacity. AMEC was engaged as Detailed Designers and Design Manager, including all laboratory speciality services.</td>
</tr>
<tr>
<td>Central Public Health, Multi-Drug Resistant (MDR) Lab, Papua New Guinea</td>
<td>AMEC designed a PC3 Laboratory for a new tuberculosis diagnostic facility, including outlined construction methods. AMEC also performed construction and commissioning assistance.</td>
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<tr>
<td>Gujurat Akruti TCG Biotechnology, India</td>
<td>AMEC completed the specialist labs component (architecture &amp; engineering) of a schematic design for Multi Tenanted Wet Labs in conjunction as part of a development plan for a technology precinct in a major Technology Park.</td>
</tr>
<tr>
<td>Pfizer Animal Health, Veterinary Medical Research &amp; Development Laboratory, Victoria</td>
<td>AMEC completed the design, project management and construction management of a laboratory upgrade for the VMRD laboratory at Parkville, Melbourne. The scope of work included the architectural, building services, automation and specialist laboratory services design (including lab gases, purified water and fermenters exhaust system) of a PC2 laboratory complex for the development of veterinary vaccines. The laboratory houses up to 500L fermentation capabilities and a dedicated PC2 liquid waste treatment system.</td>
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<tr>
<td>Ludwig Institute for Cancer Research, Biological Process Lab Upgrade, Victoria</td>
<td>AMEC was appointed to project manage and design the upgrade of an existing clinical biological processing facility to GMP Grade A, B, C requirements and to “contained current use” capability.</td>
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<tr>
<td>WHO Flu Collaborative Research Centre, Victoria</td>
<td>AMEC was commissioned to provide detailed technical and buildability reviews and provide regulatory compliance advice and assessments, as well as regular quality inspections, during construction and commissioning review for this PC2/QC2 &amp; PC3/QC3 facility.</td>
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<tr>
<td>CSL Ltd, Victoria, Sterility Test Laboratory, Victoria</td>
<td>AMEC completed design management and detail design for the QC sterility testing laboratory upgrade at CSL, Parkville plant. The project involved the design and installation of a new Grade D / PC2 laboratory to house Grade A sterility testing isolators for final product testing.</td>
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<tr>
<td>Walter &amp; Eliza Hall Institute (WEHI), Media Prep Area Redesign, Victoria</td>
<td>AMEC was commissioned to provide concept design for the upgrade and refit of this biomedical research facility support area.</td>
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<tr>
<td>BTI A*Star Clinical Trial Production Facility, Singapore</td>
<td>AMEC was commissioned to design a clinical trials production facility for Stem Cell Technologies consisting of aseptic production areas, cell banking, QA/QC Laboratories and micro test laboratory. The facility is to be licenced by FDA and EMEA.</td>
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<td>CSL Biotherapies, Saponins Facility, Victoria</td>
<td>AMEC was appointed to design, project manage and GMP qualify a product specific suite for manufacture of research materials with hazardous, flammable and toxic materials. The facility is a GMP compliant clean room to Grade C (ISO 7) and is a “clean contained” design.</td>
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<tr>
<td>Orica Water Care PC3 Development Lab, Victoria</td>
<td>AMEC was appointed project manager and detail designers for a high containment lab (PC3) for scale-up of fermentation based recombinant DNA products and preparations and TGA application for Phase II clinical manufacturing licence.</td>
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<tr>
<td>Orica Consumer Products, New Technology Centre, Victoria</td>
<td>Constructed within a hazardous (flammable) chemical laboratory environment, this facility incorporates the MIEX process for fume/vapour control and liquid collection. The MIEX Laboratory required a special purpose class 1 zone 2 flameproof laboratory fitted with two special purpose fume cupboards, resin wash facility with waste water collection and fume extraction system that incorporated dilution air dispersion technology. The new laboratory required the tie-in and integration of existing services for hot &amp; cold water, compressed air, waste water, nitrogen, power, fire services and building management (DDC) system with the introduction of new services for vacuum and fume extraction and modification to separate the existing HVAC system. The project also required flammable goods storage to incorporate control of migration of different types of odorous, toxic, corrosive and flammable chemicals without any residual effect to the existing Dulux facility.</td>
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<tr>
<td>Murdoch Children's Research Institute, Victoria</td>
<td>AMEC was appointed for review and consultation on the design, construction detailing and validation of a medical research, cell therapeutics, cord blood and stem cell facility to meet GMP requirements of Australian and European regulators.</td>
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