

**INDUSTRIALRESEARCH**  
**LIMITED**  
*Te Tauihu Pūtaiao*



annual report 2008

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PEOPLE



PURPOSE

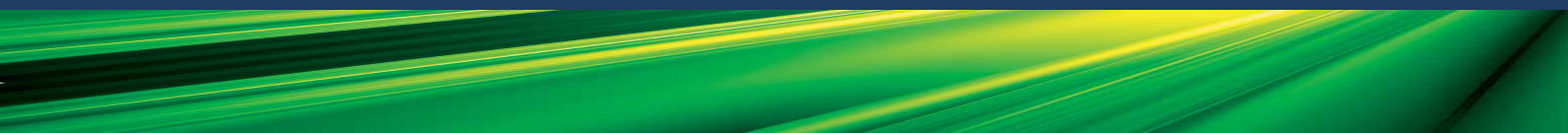


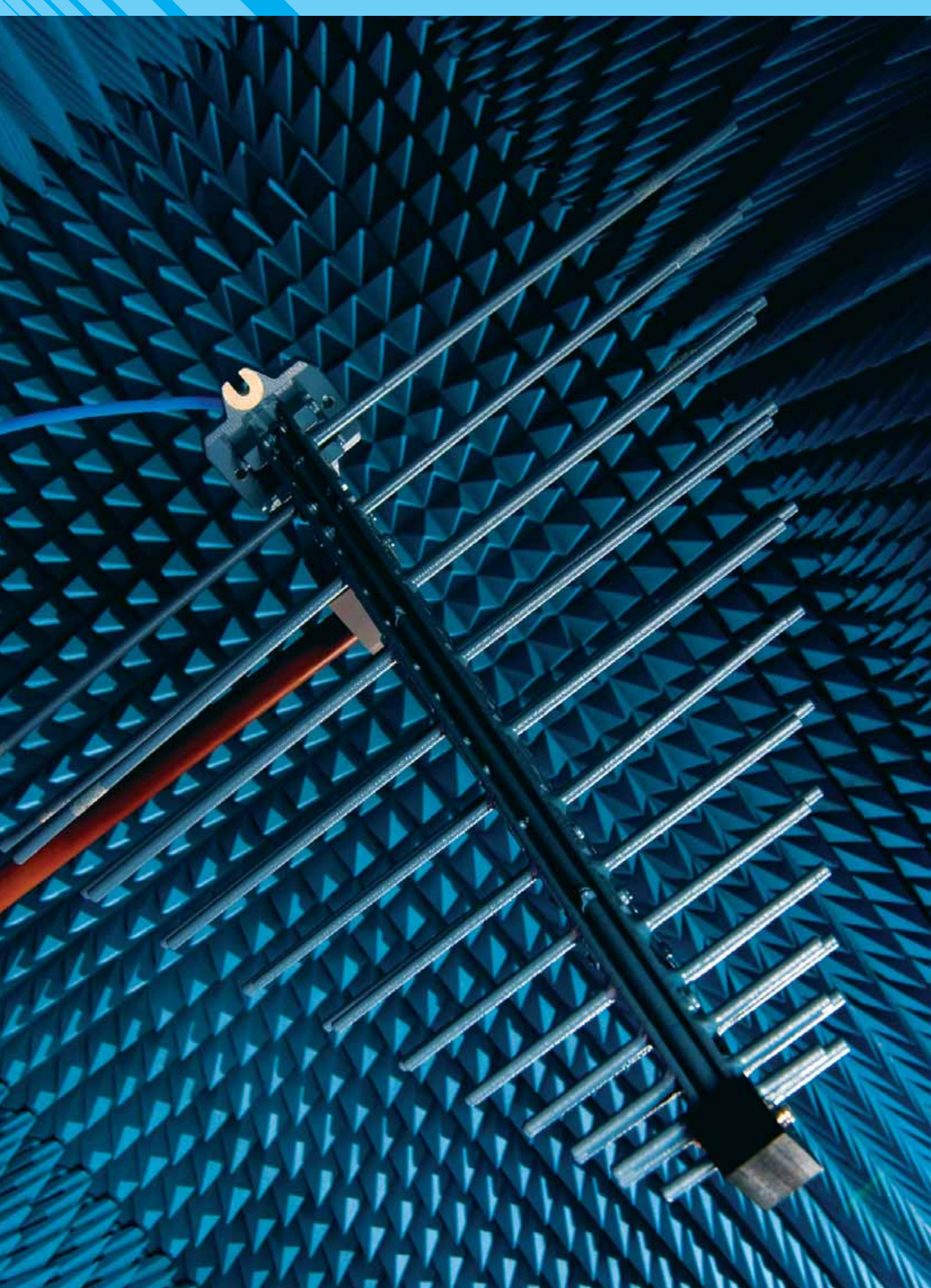
PERFORMANCE

world-class research and advanced technology

# transforming industry

and adding value to the New Zealand economy







## Who we are

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IRL is a national research enterprise with the New Zealand Government as shareholder. The foundation of our work is world-class science and engineering to transform industry and add value to the New Zealand economy.

IRL is committed to the application of research to foster innovation to the benefit of New Zealand. To do that we work closely with the industrial sector to identify, develop and deliver the technology our clients need to prosper.

Our vision for a successful IRL is that the Company will:

- + contribute significantly to the transformation of New Zealand manufacturing and industry through close working partnerships with the leading industry innovators
- + be financially sustainable, with a cost structure and expanded revenue base that allow the Company to invest in its future with confidence
- + be a high-performing Crown Research Institute with the physical resources, depth of skills and commitment to teamwork that deliver our purpose of transforming industry and adding value to the New Zealand economy through our world-class research and advanced technology.

## What we do

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In pursuing our vision of IRL as a financially sustainable, high-performing Crown Research Institute that is helping transform New Zealand industry, we focus on the needs of New Zealand industry and IRL's role in:

- + ensuring they are aware of the business opportunities in promising new technology
- + responding to the needs of businesses for novel solutions to their problems
- + using our scientific capability and links with the global science community to bring relevant scientific and technical knowledge and skills to our work.

# + Chairman's report

The 2007/08 year has brought a sense of satisfaction for the IRL Board as we report a significant improvement in the Company's financial position. IRL has ended the year with an after-tax profit of \$543,000, which is an improvement of \$6.75 million on the previous year. This much improved result is underlined by IRL's net cashflow generated from operating activities of \$5.36 million compared with the deficit of \$0.41 million in the previous financial year.

A number of factors have contributed to this result, including a strategic realignment of the business with a focus on strengthening relationships with the industrial sector, greater emphasis being placed on prudent financial management through the introduction of improved processes, the renegotiation of procurement contracts, a significant reduction in overhead costs, and increased productivity.

The Board and Executive Management's emphasis on preserving and enhancing New Zealand's investment in science has been another factor in the improved performance, with IRL's reputation as a research leader being further enhanced by the quality of the work produced. We can end the year with greater confidence about the future of the Company and the part it can play in boosting New Zealand's industrial capability.

The Board sees the Government's announcement in December 2007 of an equity injection of \$12.5 million as a vote of confidence in IRL as a commercially sustainable company delivering world-class science and technology. The money is earmarked for specific projects to strengthen the Company's physical infrastructure and to ensure we have the equipment a national research enterprise requires. It is also going towards building IRL's commercialisation and business development capacity, which is a key part of our continuing emphasis on greater engagement with industry.

A further endorsement of IRL's ongoing viability was the signing of two key 10-year contracts worth around \$17.5 million with the Foundation for Research, Science and Technology. One is for research into new glycotherapeutic drugs and the other for Information and Communications Technology research.

One of the most important developments of the year was the signing of a joint venture agreement between IRL and General Cable to form a new company, General Cable Superconductors Limited, to develop and commercialise the high temperature superconductor (HTS) cable technology that has come out of IRL's HTS research. This opens up the potential for HTS to be used in a far wider range of applications than single HTS wire, including high-current machines and those operating on alternating current. This will be particularly important for IRL's associate company, HTS-110, allowing it to increase the range of superconducting magnets and generators it produces for the global market.

When the HTS research programme was first established in the 1980s to investigate practical effective superconducting materials this was considered to be "blue skies" research, but the research team has constantly had in mind its application within industry and its potential as a niche industrial area for New Zealand. The joint venture is an important step in realising that vision.

Another development during the year has concerned IRL's specialty Active Pharmaceutical Ingredients (APIs) development and small-scale manufacturing facility, GlycoSyn. The facility is a certified good manufacturing practice plant that specialises in small molecules, peptides, carbohydrates and multi-step synthesis of APIs for use in pre-clinical and clinical trials. It also draws on the world-class expertise of IRL's Carbohydrate Chemistry team.

As GlycoSyn's business and potential client base have expanded, there has been a question around how best to ensure the unit could be developed to take advantage of market opportunities, and

consideration has been given to seeking a suitable external investor. During the year, GlycoSyn has concluded firm contracts (including a major one with Australian company Mimotopes – a specialist in peptides), which means the search for outside investment will be refocused. But in the meantime GlycoSyn will continue to operate as a stand-alone business unit within IRL with any decision on seeking outside investment to be revisited when appropriate.

The Board has been only too aware of the atmosphere of uncertainty and the great changes that IRL staff have endured during the past few years. Despite these difficult times, IRL's science teams have sustained their activity and have continued to produce world-class science. Now that the environment is much more stable, the Board would like to pay tribute to the dedication of staff and the fact that they continued to produce excellent work in spite of what was happening around them. It is because of their focus that IRL had another very successful year in the 2008 Foundation for Research, Science and Technology funding round. Eleven of the 18 research proposals put forward were successful.

The Board also would like to thank the executive team for its commitment to keeping IRL's recovery on track and ensuring we have a solid company that is poised for future growth. Particular thanks also go to the Chief Executive, Shaun Coffey, for his leadership both inside IRL and in the wider

science community. In particular we would like to acknowledge his role in helping set up Science New Zealand, an initiative by the nine Crown Research Institutes promoting the value of science and technology to New Zealand. An understanding by New Zealanders of the contribution Crown Research Institute science makes to the economy and our way of life is essential in ensuring continuing financial support for research and development. For IRL, it is also vital that companies are aware of how science and engineering can enhance their businesses.

The end of this financial year has seen the retirement of director Anita Mazzoleni. As Chairman, I want to thank her, on behalf of the rest of the Board, for her significant contribution to IRL during her tenure.

At the same time, I would like to welcome to the Board Catherine Drayton, who took up her role as a director on 1 July 2008.

While the 2007/08 financial results are heartening, there is of course no reason for complacency. However, we have a sense of confidence that IRL is rapidly building its ability to manage in a climate of ongoing uncertainty as we continue to focus on bringing brilliant ideas to market to transform New Zealand industry and positively influence people's lives.



A handwritten signature in black ink, appearing to read 'Brian Rhoades'. The signature is fluid and cursive.

Brian Rhoades / Chairman

# + Chief Executive's report

## + Not by research alone

Industry has faced a number of shocks in the last year that have dampened the appetite for innovation. The credit crisis, rising debt, currency volatility and increasing pressure from low labour cost manufacturing overseas have stimulated much uncertainty about the future of New Zealand manufacturing and industry.

Maintaining global competitiveness is the agreed aspiration, but there is no agreement on the right approach to ensure we achieve that target. One side highlights the low support for research by both government and industry. The other emphasises technology transfer and commercialisation as the required focus.

In reality, research and application cannot be separated. Research alone is not enough, and commercialisation will not persist without a steady flow of new knowledge from R&D. Together they provide the springboard the innovation industry needs to prosper and contribute to an improved quality of life in New Zealand.

IRL has a long history of successfully working with industry to achieve the innovation necessary for growth and development. Recent initiatives in government policy, such as the R&D tax credits scheme, provide further encouragement for industry to partner with IRL in research activities. The improved business performance of IRL makes this easier, but structural adjustments are still required in New Zealand's R&D environment if the sector is to truly achieve the pace of change needed to enable industry to capitalise on market opportunities.

The lack of core funding, for example, means that average start-up times for R&D projects with industry are significantly delayed. Put simply, the R&D sector has limited capacity to achieve the clock speed New Zealand needs. And, consistent with global trends, the absence of core funding has led to long-term erosion of both the physical and human capital essential for future advance.

In such an environment it is pleasing to be able to report that over the last year IRL has returned to profitability, is investing in the future, and continues to work closely with industry to transform the economy.

## + Financial performance

The improvement in financial performance reported in last year's annual report has continued through 2007/08, and it is particularly pleasing to note that savings from cost reductions have continued to be realised. In a business where cash is king, IRL has generated \$5.4 million cash flow from operations, compared with a \$414,000 cash outflow in 2006/07.

The operating profit of \$1.4 million is well ahead of budget, and compares with a \$2.2 million loss last year. NPAT is \$543,000, compared with a loss of \$5.7 million the previous year.

The balance sheet has strengthened significantly, with non-current liabilities being \$577,000, compared with \$12.5 million (including \$11.9 million of bank debt) last year. Net assets have grown from \$19.8 million to \$28.6 million.

It is pleasing to see that the attention given to managing all areas of the Company's operations has substantially improved. IRL now operates well within its means.

## + Equity injection

In repairing its balance sheet, IRL was acutely aware that it required additional capital to invest in future capability. Our shareholder, the New Zealand Government, has shown the confidence in the renewed IRL to invest \$12.5 million in the form of an equity injection. This money is specifically tied to two areas: stimulating business development to improve our partnering with industry, and the purchase of new equipment essential to our operations. It cannot be used for debt reduction or general operations.

I particularly thank our former and present Ministers, Steve Maharey and Peter Hodgson for the confidence they have shown in IRL.

## + Partnering for success

Among many highlights, IRL established a joint venture company in late 2007 with the General Cable Corporation to commercialise more of the technology coming from our long-running high temperature superconductivity (HTS) research. General Cable Superconductors will turn fragile

HTS wire into robust cables for use in the power and energy markets. This is our second company in HTS, and represents another step along the path to establishing an HTS industry in New Zealand.

The highly regarded HTS team has been invited to join the US-based Wire Development Group – which brings together some of the world's leading superconductivity researchers.

There are good examples of our approach to R&D. All our research has the end-user as its beneficiary, and decisions on where best to focus considerable science and engineering expertise are guided by our purpose of achieving transformation of the economy. Industry development is fundamental to this purpose.

Another important IRL collaboration has been with the Albert Einstein College of Medicine in New York, and that partnership is not only continuing but has been extended to include work on using enzyme inhibitors (which are designed to stop enzyme processes that can lead to disease) in the treatment of Tb, to overcome the problems posed by antibiotic-resistant strains of *Mycobacterium tuberculosis*. Other IRL research is also showing potential for use in the health sector, this time in medical devices that use sensors and nanotechnology for diagnosis.

#### + Recognition of our people

Among the notable awards in the past year, one was to Tim Haskell, who received the Antarctic Medal in the 2008 New Year's Honours List. This recognised his work in Antarctica as a physical scientist since 1978, and, in recent years, in research on the relationship between sea ice and climate.

Tim was also one of three of IRL's top scientists promoted to the position of Distinguished Scientist. Similar recognition was accorded Rod White, whose research in thermometry prompted a change in the fundamentals of the international standards relating to temperature; and Peter Tyler, who pioneered the design and synthesis of new biologically active carbohydrate molecules and set the foundation for IRL's world-renowned glycotherapeutics research programme.

Natural products chemist Lai Yeap Foo was acknowledged for his major contribution to

international molecular nutrition and food science through work to identify the active compound in cranberries that prevents urinary tract infections and has other health benefits. In the years since his research, trade in cranberry products worldwide has increased by 150% and cranberries are now being grown in New Zealand for the local market. It is a timely reminder of the impact R&D can have on an industry.

Two of New Zealand's young scientists were chosen to represent the country at prestigious meetings attended by Nobel Laureates. James Storey, from IRL, was one of two New Zealanders chosen to attend the 2008 Nobel Laureate meeting in Germany, while Conrad Lendrum was among three New Zealand researchers selected to attend the inaugural HOPE meeting in Japan, which brought together young scientists from the Asia-Pacific region with leading scientists from Japan, and around the world.

Bridget Ingham has been appointed to a part-time role as Technical Director of the New Zealand Synchrotron Support Programme. This involves co-ordinating New Zealand's use of the Australian Synchrotron in Melbourne on behalf of the 11 New Zealand research institutions, including IRL, that are members of the New Zealand Synchrotron Group.

#### + Engaging, rewarding and developing our people

The new remuneration system reported in last year's annual report was fully operational by November 2007. Under its operation, staff performance is able to be better recognised, and remuneration levels better reflect the Company's future objectives and improved financial position.

The 2007/08 survey of staff satisfaction showed uniform improvements in all categories. Staff report a strong commitment to IRL and its purpose. Morale is high.

Several groups have now progressed through IRL's leadership programme, and are making valuable contributions to the Company. During the year we had added other development activities, such as financial training, to our schedule as part of a strong commitment to capability building.

## + Science and engineering: the way ahead

IRL still has much to do to fulfil its purpose of creating new processes and products to help industry and commerce prosper. The creation of a new Science and Engineering Group to replace a disparate grouping of technology platforms is designed to sharpen this focus. Fewer groups, more directly connected with industry, should help to grow our engagement, and commercial activities. These arrangements also acknowledge the important part engineers play in our operations.

A new position (Science Development Manager) has been created to give more emphasis to the quality of our science and engineering outputs. This recognises the critical importance of maintaining our position at the leading edge of knowledge generation and application.

This is also reflected in our new Māori identity – Te Tauihu Pūtaiao – figuratively the leading edge of science.

## + Appreciation

IRL has many talented people working for the company and dedicated to making New Zealand a better place to live. Their efforts in turning around our performance have been remarkable, and I thank them sincerely. Thank you also to the executive team for the leadership they have shown.

I particularly thank Brian Rhoades and the Board of Directors for their support and advice during a very satisfying year.

Many people outside IRL have also provided enormous support and encouragement during trying times – too many to acknowledge individually. They maintained their faith in IRL, and I hope that we are repaying that trust.

IRL will continue to do what it does best – delivering research solutions to industry on time, to specification and on budget – solutions that create competitive advantage for industrial firms.



Shaun Coffey / Chief Executive





IRL IS PARTNERING WITH INDUSTRY TO

## + transform the New Zealand economy through emerging technologies

Using its world-class science and engineering capability, IRL develops new technologies that lead to the diversification of New Zealand's economy into exciting new areas.

This diversification can happen through the creation of new business opportunities for existing business in new high-value product lines and in new technologies that revolutionise the production process. IRL research also provides the basis for the creation of entirely new high-tech, high-value industry sectors for New Zealand.

IRL ensures this research is translated into business opportunities by identifying and engaging commercial partners that can provide relevant manufacturing and marketing expertise to the venture. Promising businesses may be spun off using capital and commercial expertise from external providers.



### + New Zealand gains global edge in high temperature superconducting

The commercialisation of high temperature superconductor (HTS) solutions developed at IRL took a leap forward during the year with a joint venture formed between IRL and a local subsidiary of General Cable Corporation to develop and manufacture HTS cable in New Zealand.

The joint venture – General Cable Superconductors Limited – aims to have a locally manufactured HTS cable available to the global market within two years, putting New Zealand significantly ahead in the drive to establish HTS as a key technology for the 21st century. It is estimated that by 2015 the potential global market for HTS cable will be in the region of \$295 million.

IRL and General Cable are each investing around \$2.4 million over the next three years. A prototype manufacturing facility is being built at IRL's Gracefield base for eventual establishment in another stand-alone facility, with the first HTS cable to be manufactured in September. Building on more than 20 years of HTS research, IRL has produced an effective and cost-efficient method of manufacturing HTS cable, unlocking its potential to carry high electrical currents with lower losses of energy in a wide range of applications.

IRL spin-off company, HTS-110 will be a major customer for the cable, using it for new, higher-performance products such as magnets and devices for the power industry.

Meanwhile, HTS-110 has continued to develop and expand its HTS product range for the non-utility market. This includes nuclear magnetic resonance (NMR) equipment using HTS technology for process control in oil refineries, ion-beam implantation devices for the semiconductor industry, synchrotron magnets for high-energy physics research and the nuclear industry, and a reliable, low-cost cryogenic refrigeration system.



HTS cable

### + Biotech product development fast-tracked

Globally, demand for naturally derived products that accelerate tissue regeneration is growing fast and IRL is helping New Zealand companies compete for market share. Biotechnology company Mesynthes is using IRL scientist Keryn Johnson's specialist knowledge about the extracellular matrix (ECM), the cell's natural environment, to develop products for wound healing and surgical tissue reinforcement procedures. ECM-based products are proven to be effective in healing wounds and regenerating skin, muscle and connective tissue.

Mesynthes CEO Brian Ward says the company's products will have unique advantages. "Our technology can be used where healing has to take place under a constant load and strong material is needed. We are targeting treatments for conditions where there really has been no effective way to stimulate and speed up wound healing."

Mesynthes is also able to produce relatively large sheets of healing material, suitable for covering large burns or areas of damaged soft tissue.

"We've made stunning progress using the knowledge within IRL, achieving in five months what it might have taken us a year to do otherwise," says Brian Ward.

One area where IRL scientists have helped the company is in a greater understanding of the biological components in its products. The other is development of a commercial-scale manufacturing process which, says Keryn Johnson, uses "biomimicry", where the natural properties of the tissue are harnessed to aid its processing.

## + Widening the choices

Demonstrating the feasibility of a seaweed aquaculture and processing industry in New Zealand for value-added products was the aim of a six-year FRST-funded Carbohydrate Chemistry project that ended in June 2008. Ruth Falshaw and her team selected an indigenous seaweed, *Gigartina atropurpurea*, for the programme because they knew from previous research that it contained high levels of polysaccharides known as carrageenans, which are widely used in foods but are also bioactive – meaning they may have medical uses.

With the aid of NIWA scientists, three marine farmers, a fish-drying facility in Marlborough, and several natural products manufacturers around the country, the IRL team experimented with growing the seaweed from spores, “planting” strings of them in mussel farms, and drying and then grinding the harvested seaweed to extract the bioactive compounds, before supplying them to natural products companies for use in new products. They learned when the wild seaweed was fertile and how to harvest the spores, how long the germinating spores needed to be kept in special tanks before planting in open waters, how well they grew in a marine farm environment, and how they should be harvested. The good news is that *Gigartina atropurpurea* is a successful aquaculture crop growing as well as, if not better than, it does in the wild. The research found that cutting it for harvest accelerated its growth, meaning farmers can harvest each plant up to three times before it needs replacing.

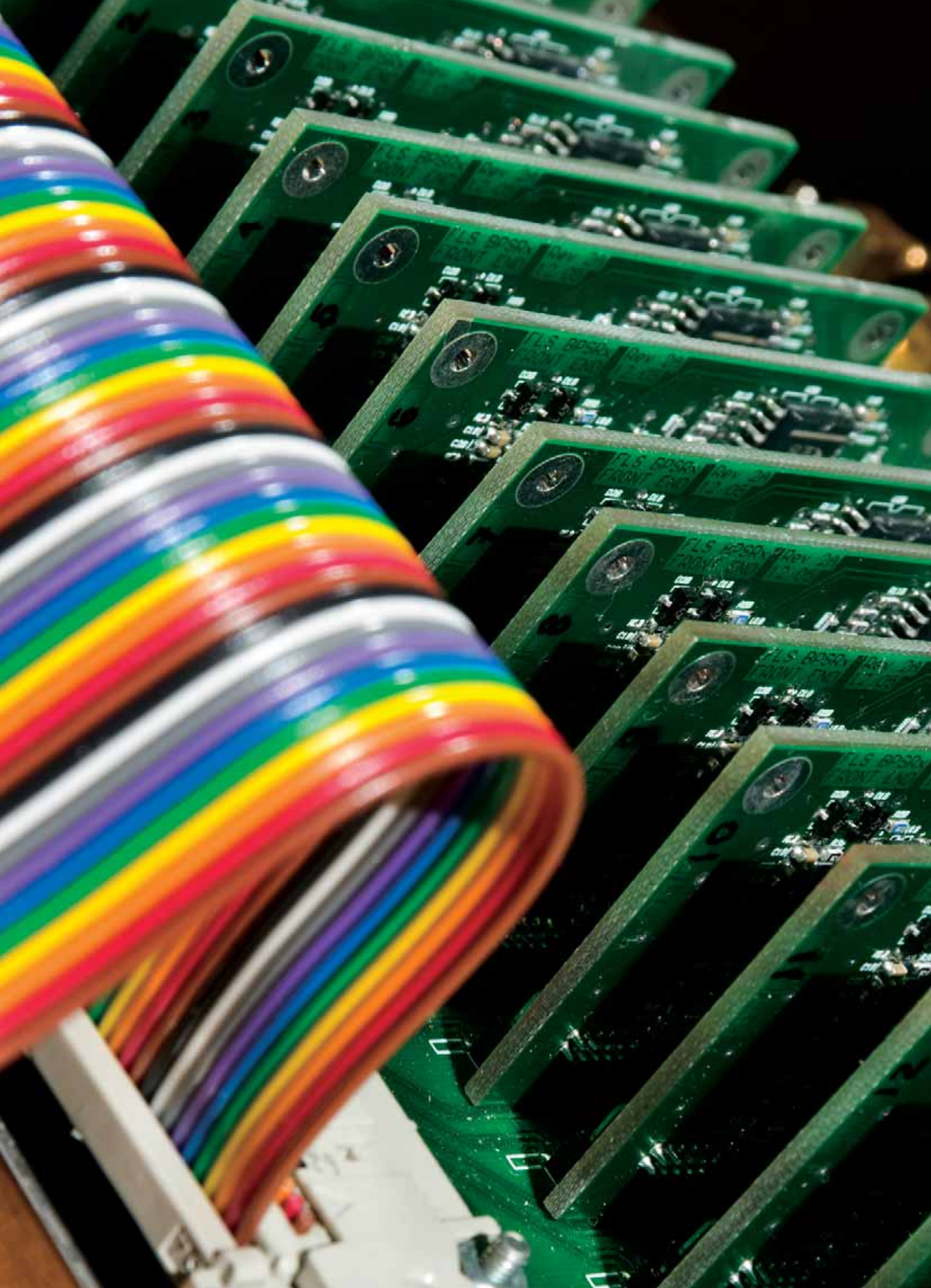
## + Growing health innovation

Medical technologies is an emerging sector in New Zealand and, as a knowledge-intensive industry, producing low-volume but high value products, it holds a lot of promise.

IRL is working collaboratively with other agencies represented on the NZBio Medical Technologies Special Interest Group, to establish New Zealand as an internationally competitive centre for the development and manufacture of niche medical devices. Diana Siew, IRL's Imaging and Detecting Team Manager, is part of the executive committee contributing to knowledge of research and expertise in medical device development.

This year, the Medical Technologies group has secured funding from the Foundation for Research, Science and Technology and New Zealand Trade and Enterprise (NZTE) to carry out the first phase of a roadmap for industry growth. This capability study of the industry will audit strengths and identify niche areas that New Zealand could focus on for the future. IRL is leading the sub-committee overseeing the project along with representatives from Adept Medical, NZTE and the Medical Industry Association of New Zealand (MIANZ).

IRL has also been a key contributor to a Ministry of Economic Development initiative focused on health innovation to grow the value of earnings from medical devices and health information technologies.



IRL IS PARTNERING WITH INDUSTRY TO

## + foster the expansion of existing New Zealand businesses

IRL research and development plays a significant role for companies wanting to make major changes to radically improve the performance of their core business. This may be through significant increases in productivity or by introducing innovative next-generation products and services that will increase their revenue and expand their market share.

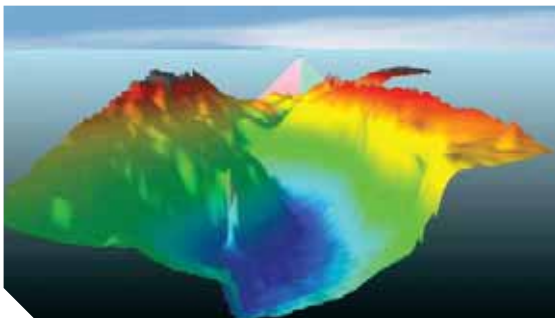


### + Next-generation marine navigation products

IRL research into sophisticated sonar technologies for helping marine vessels detect obstacles and navigate dangerous waterways is creating a new sector in the New Zealand marine industry. Called Forward Looking Sonar (FLS), the technology combines IRL expertise in digital signal processing, electronic design and transducer design to help vessels safely navigate in challenging conditions such as search and rescue operations in shallow water and rough weather.

The FLS research project grew out of collaboration with leading marine electronics company, Electronic Navigation Limited (ENL), which commissioned IRL to custom design sonar electronics, processing and transducers for its new WASSP product. WASSP uses multi-beam technology and advanced signal processing to provide fishermen with very detailed sea floor profiles and 3D location of fish schools. IRL produced 100 sonar transducer units and has since transferred the manufacturing technology to ENL with ongoing collaboration between the two to improve current products and investigate diversification into other, cutting-edge, sonar solutions. At the same time, IRL is continuing its wider FLS research programme with the project team having designed and implemented a versatile test platform which allows a range of different sonar system options to be trialled.

IRL Research Scientist Eugene Stytsenko says that design approach is delivering optimised solutions for particular ranges of tasks, at different performance levels and prices, which will help IRL work with partners across the marine industry and build a new area of expertise for New Zealand.



WASSP depicts a 3D profile of a channel in the sea floor.

### + Automating meat processing

The meat processing industry is a crucial part of New Zealand's industrial infrastructure but it is currently facing productivity and profitability issues. As an industry that is subject to seasonal variation, the meat processors have been particularly affected by the tight labour market. The industry has also been affected by low prices on world commodity markets and many farmers, discouraged by low returns, have abandoned sheep meat production. As a result, the industry is working with IRL's Engineering Innovation team to transfer leading-edge technology to automate meat processing and ensure its viability in the long term.

The IRL researchers have already developed an intelligent robotic system to make the first cut in the sheep's carcass (known as the Y-cut) and another to cleanly remove the pelt from the body using gas. One Y-cutter has been sold to an Australian meat works, where it has processed over 2 million lambs since November 2005. Another is on lease to a New Zealand meat works and has processed 700,000 carcasses since it was installed in March 2007.

Now a partnership has been formed to set up a meat industry consortium that will carry out research and development into increasing the use of automation in our meat plants.

IRL IS PARTNERING WITH INDUSTRY TO

## + sustain the value of existing businesses

IRL development projects ensure companies make incremental productivity gains and improvements to their existing products and services so that they remain profitable and competitive in the marketplace.



### + Character testing for wind turbines

*Pinus radiata*, a New Zealand plantation timber commonly used in the construction industry, is now being made into 16-metre blades for Windflow Technology Limited's wind turbines and IRL is testing their capacity. The timber/epoxy blades are undergoing stringent testing to prove their ultimate strength and fatigue properties when oscillating under load. The blades, manufactured by Windflow subsidiary, Wind Blades Limited, are designed to cope with New Zealand's strong wind conditions and the uneven nature of wind gusts.

While the blades have already passed strength and stiffness testing, the IRL results will feed into documentation needed by Windflow for international certification.

Windflow's Mechanical Design Manager, Richard Trudgian, says the certification will open up new customer opportunities overseas and is critical for export success.

It is the first time a wind turbine has been through this testing procedure in New Zealand.

### + Clearing the path for exports

New Zealand's reputation as a trusted trading partner owes a lot to the Measurement Standards Laboratory of New Zealand (MSL) – part of IRL. If nations are to trade freely, they need to know that internationally agreed measurement standards are being maintained in the country of origin: health regulations may stipulate food products are maintained at a certain temperature during processing and transport; a manufacturer ordering parts needs to know they will all fit together; and food retailers abroad want to be sure the one kilogram block of New Zealand cheese really does weigh that.

MSL vouches for the New Zealand standard and works with other measurement laboratories around the world to ensure international compatibility. MSL also helps industry by developing new techniques and instrumentation to overcome technical trade barriers and to ensure efficiency and productivity. For example, a local manufacturer of electronic goods for export to Europe was required to provide that the LEDs on the device met the European specifications. Measurements made by MSL allowed the devices to be immediately accepted in Europe. MSL also provides regular training courses to ensure individual New Zealand businesses have the measurement expertise they need.

### + Partnering for problem solving

Fast, accurate scientific support is important for a company producing high-performance coatings that have to survive rugged environments like windswept coastlines, the ocean and industrial complexes. PPG Industries New Zealand Limited is New Zealand's largest developer and supplier of industrial coatings for steel, wood, packaging, marine and heavy industrial uses together with protective powder and decorative coatings for a wide range of applications.

The company has been working with IRL for a decade, through a relationship that began with a chance meeting between PPG's General Manager, Lou Gommans, and IRL's Imaging and Detecting Team Manager, Diana Siew. "IRL provides a raft of analytic methods to help us solve day-to-day problems such as product failures, understanding defects or needing more information about the chemistry and composition of our coatings," says Lou Gommans.

PPG's research and development team carries out plenty of fundamental research but Lou Gommans says IRL is a valued partner because of its sophisticated testing and analytical equipment, its in-house knowledge and its network of contacts to tackle problems outside their expertise. "It's quick and simple. We channel all our enquiries through Diana Siew and usually get a report back within a week."

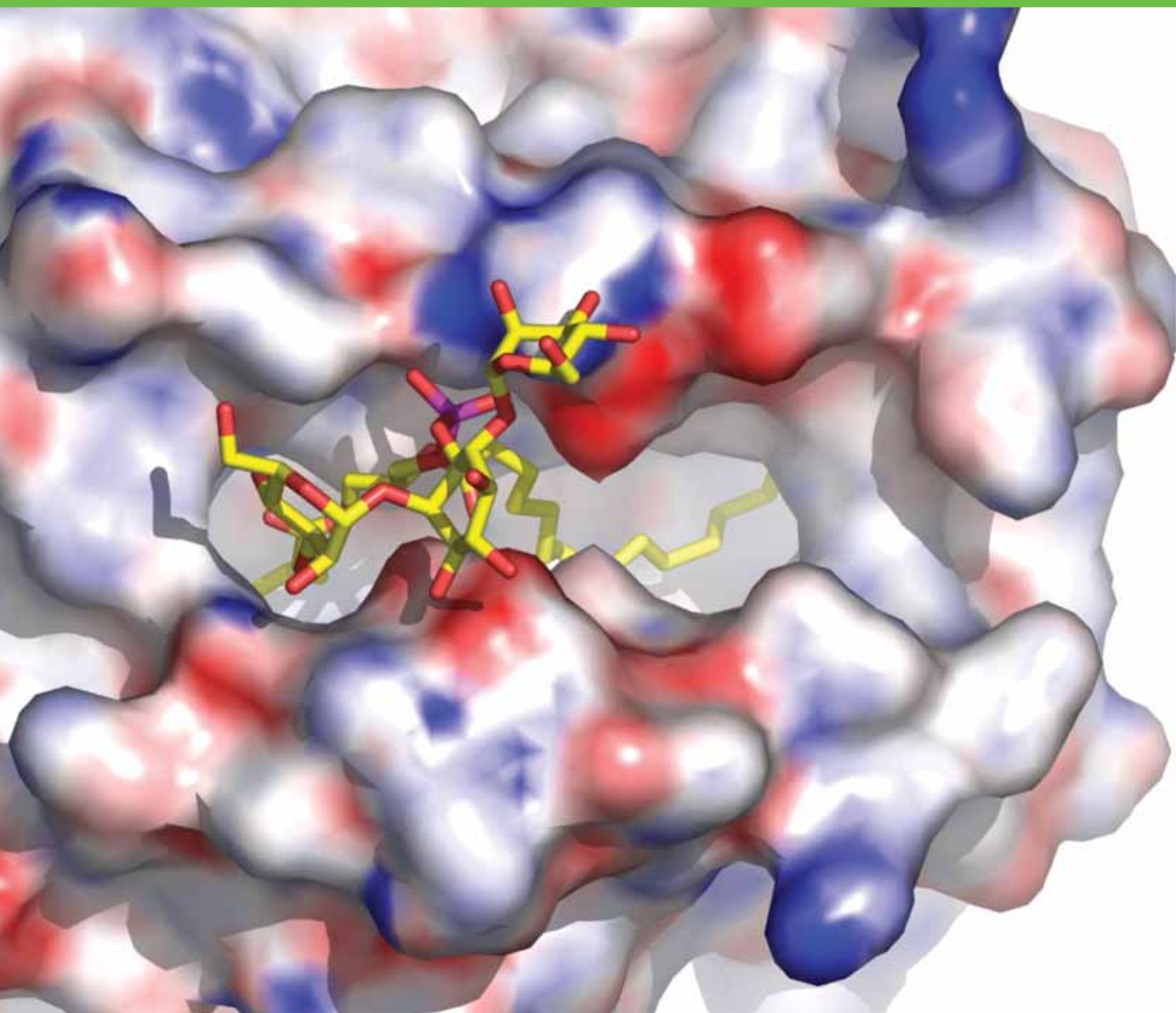


The tinting room at PPG Industries New Zealand Limited.

## + IRL research is benefiting New Zealand in other ways

IRL research does not just have economic benefits. Some research is of strategic importance to New Zealand – for example our research into renewable energy resources, which can ensure secure electricity supplies that do not impact on the environment.

Other research focuses on health, including medical devices for diagnosis and drug discovery chemistry for new drugs that could alleviate some of our most serious diseases such as cancer and autoimmune diseases.



### + Helping vaccinations work more effectively

A promising new area of research for IRL's Carbohydrate Chemistry team is vaccine adjuvants – the name given to components that can increase the effectiveness of vaccines by helping activate the immune system. This can result in cheaper vaccines because less of the expensive active ingredient is required to achieve vaccination. This is also particularly important where vaccines are in short supply, or in a pandemic, since the better an adjuvant is at promoting an immune response, the further the limited vaccine stock will go.

The IRL research is developing discrete, synthetic new compounds that have shown potential as effective adjuvants for vaccines. One compound is based on a component found on the surface of common bacteria and has been shown to stimulate what is known as cell-mediated immunity. The process uses dendritic cells – immune cells found in areas of the body most in contact with the external environment such as the skin and the tissue lining of the nose, lungs, stomach and intestines. The dendritic cells process foreign material and then migrate to the lymphoid to activate other immune system cells to initiate an immune response. The dendritic cells present markers specific to the foreign material (antigens) to the body's infection-fighting T-cells. These T-cells will bind to the surface of any cells displaying that antigen, releasing chemicals to kill those cells. This is a different mechanism from most conventional adjuvants, which act by inducing the production of antibodies. Because the immune response results in cells being destroyed, it is effective in some of the most serious health conditions we face, such as cancer and chronic autoimmune diseases. A collaboration has been formed between IRL, Victoria Link Limited (the commercial arm of Victoria University), the Malaghan Institute of Medical Research and regional development agency, Grow Wellington to develop IRL's lead compound as an adjuvant in an anti-cancer vaccine.

The adjuvant will be progressed as far as possible down the drug development path within New Zealand. This will maximise the return to New Zealand from eventual licensing to international pharmaceutical companies. This initial drug development will utilise New Zealand manufacturing, analytical and drug stability, formulation, animal testing and clinical trial companies. This feeds New Zealand's burgeoning



*Gavin Painter (left) and Phil Rendle use IRL's recently upgraded 500 MHz NMR spectrometer to analyse adjuvant samples.*

pharmaceutical industry and assists in removing a majority of the product development risk, increasing the product's value.

### + A secure, sustainable energy supply

Concern about climate change has heightened the interest in new solutions for our energy-hungry society. The search for sustainable, renewable energy sources that will ensure New Zealand has the energy it needs into the future is the focus of IRL's energy research. Hydrogen energy is an important part of that scenario, with some believing it may be the replacement for fossil fuels for the transport industry. However, the infrastructure needed to make that a reality is decades away so IRL researchers developed a niche application for hydrogen to provide energy in remote areas. Known as Hylink, this system uses an electrolyser



*The experimental Hylink system in operation.*

to convert wind and small-scale hydro energy to hydrogen, which is then fed along a polymer pipeline to where it is needed. The energy can be used directly for heating or stored in a fuel cell for future use. The hydrogen pipeline has the advantage that it is much cheaper to install than overhead transmission lines and very little energy is lost in transit.

IRL is also part of a wider collaboration with CRL Energy Limited to produce hydrogen from New Zealand's lower-grade coal reserves for use in fuel cells.

### + Listening to foetal heartbeats

A collaboration by IRL and Victoria University of Wellington is breaking new ground with its work aimed at developing technology for passively monitoring the heartbeat of unborn babies. The work is part of IRL's Blind Source Separation research, which involves developing algorithms to allow the separation of mixed signals or a signal that is masked by noise or interference.

The research aims to create technology that separates foetal heartbeats from interfering sounds such as the mother's heartbeat and digestive noises, helping to reduce the need for repeated or extended use of ultrasound on unborn babies. A second-generation device with 16 sensors has now been completed.

Research is also being undertaken to apply the technology as a diagnostic tool for neurological conditions. The aim is to separate out specific signals from EEGs of brain activity to detect seizures or other conditions. The goal is to develop proof-of-concept prototypes. In parallel, a novel microphone structure has been developed as part of the new listening system.

The new knowledge also has potential for application in other niche medical equipment.

## + IRL is encouraging innovation

As an innovative R&D company, IRL has an obvious interest in encouraging innovation in New Zealand business. With that in mind, we sponsor several awards programmes that recognise innovative projects, products and business ideas.



*New Zealand Engineering Excellence Awards 2007. IRL CEO Shaun Coffey (centre left) and Air New Zealand CEO Rob Fyfe congratulate Warwick Cutfield of Maunsell Limited and Vil Joen of Watercare Services (far right) on winning the IRL Manufacturing and Mechanical Award.*

### + New Zealand Engineering Excellence Awards

These annual awards recognise the professional engineers in New Zealand who have demonstrated innovation and creativity in a particular project. In 2007, IRL sponsored the Mechanical and Manufacturing Award, which went to Maunsell Limited for its work on a biogas co-generation plant for Watercare Services' Mangere wastewater treatment plant. The brief was for a plant to produce energy from the waste – biogas – produced by the plant. The facility employs technologies such as zero-waste methane gas control and noise and odour reduction measures – technologies that had never before been implemented in New Zealand.

[www.maunsell.com/index.html](http://www.maunsell.com/index.html)

[www.watercare.co.nz/index.sm](http://www.watercare.co.nz/index.sm)

### + PricewaterhouseCoopers 2007 Hi-Tech Awards

The IRL Emerging Company Award went to Christchurch-based company, Energy Mad. Formed in 2004, the company implements large-scale energy efficiency projects that reduce carbon dioxide emissions – one of the major factors in climate change. Their projects include the low-energy Ecobulb and, more recently, EcoSmartHome – a home energy reduction initiative that offers home energy advice and a range of energy efficiency product packages.

[www.energymad.com/nz/](http://www.energymad.com/nz/)

### + Cable Car Challenge

IRL supports this initiative to give individuals from the Wellington region with a good idea the chance to present their business plan to a panel of business professionals. The winner receives a cash prize and a capital injection to implement their plan. The Challenge gets its name from the fact that finalists must present their business plan to the judges in the time it takes for the Kelburn Cable Car (the venue for the finals) to reach its destination.

## IRL research has also helped companies produce products that have themselves received awards.

+ **The Lomak** (Light Operated Mouse And Keyboard) computer keyboard for the disabled, marketed worldwide by Opdo Limited, won one of two gold awards in the computer equipment category at the 2007 International Design Excellence Awards. The Lomak system uses a head-mounted laser beam to activate light-sensitive keys on a specially designed keyboard, and provides full computer access for anyone who has difficulty using their fingers to type on an ordinary keyboard. IRL automation researchers helped the keyboard move from great idea to reality, developing the software, writing the manufacturing assembly instructions, and helping to resolve a number of manufacturing problems. The keyboard has had other accolades for its elegance and utility. It was on display at the Museum of Modern Art (MoMA), New York, for three months earlier this year as part of the "Design and the Elastic Mind" exhibition, showcasing the latest advances in design in a modern and changing world. A keyboard has now been included in MoMA's permanent collection in the Department of Architecture and Design. For New Zealand designer, Peter Haythornthwaite of CreativeLab, MoMA's decision is "a dream come true".

[www.opdo.com/](http://www.opdo.com/)

+ **A drafting and teat spraying system** developed by Rotorua company, Technipharm with IRL know-how was awarded the Innovation Centre Equipment Entry of the Year trophy at the 2008 Mystery Creek Fielddays. Speed Sensitive Technology (SST™) offers farmers an easier means of handling and sanitising cows after milking, through smart technology developed by IRL that senses an animal's walking speed and responds accordingly. As the herd files out of the milking shed, the system can detect where a cow is and adjust automatic teat spraying for maximum effect. Teat spraying with products that disinfect and condition after milking is a proven tool in reducing the risk of mastitis, an infection that costs individual dairy farmers, on average, around \$12,000 a year.

[www.technipharm.co.nz/](http://www.technipharm.co.nz/)

+ **New Zealand Pharmaceuticals (NZP)** – which has a close relationship with IRL's Carbohydrate Chemistry team – won the 2007 Agritech, Life Sciences and Biotechnology Exporters of the Year Award at the New Zealand Export Awards.

The judges said the company had continued to grow despite difficult global trading conditions, was responsive to markets and had the ability to transform and compete. NZP was formed in 1971 to extract and purify biochemicals from by-products of the New Zealand meat processing industry but, realising diversification was key to future growth, it refocused in the 1990s onto plant extracts. The close relationship with IRL developed during collaborative research projects and technology transfers over a number of years. As a result, in 2003, the Carbohydrate Chemistry team licensed a process which NZP scaled up to produce a specialty carbohydrate known as N-acetyl-mannosamine or ManNAc, which is used in a number of GMP (Good Manufacturing Practice) pharmaceutical applications. This new business was a significant contributor to NZP's growth.

[www.nzp.co.nz](http://www.nzp.co.nz)

+ **Mende Biotech** was awarded the Natural Products New Zealand Innovation in Science and Technology Award at the 2008 Natural Products New Zealand Annual Gala Dinner held in Rotorua in April. The company gained the award for its developments in the processing of Totarol™. It is derived from a product found in totara trees and it was first identified by IRL scientists and extracted using a process known as supercritical fluid extraction. It has antiseptic and anti-oxidant qualities and is used by Mende Biotech in a range of products, including toothpaste, cosmetics and acne treatments. In Europe, global skincare company, L'Oreal has released its first totarol product, a moisturiser and blemish cream, with further products in development.

[www.totarol.com](http://www.totarol.com)

*IRL's Carbohydrate Chemistry team regularly visits Albert Einstein College of Medicine in New York as part of the long-term >> collaboration between the two research institutions.*

*From left: Vern Schramm (Professor & Ruth Merus Chair, Department of Biochemistry at Albert Einstein College of Medicine), Peter Tyler (Distinguished Scientist, IRL), Gary Evans (Senior Research Scientist, IRL), Shivali Gulab (Research Scientist, IRL) and Richard Furneaux (Group Science Manager, Carbohydrate Chemistry, IRL).*

## + IRL is a highly valued member of the innovation community

IRL's purpose is to use world-class research and advanced technology to transform industry and add value to New Zealand's economy, and our connections into the international innovation community are vital to that.

Our global connections and collaborations ensure we are aware of the latest trends in scientific research and of the emerging technologies we should adopt and adapt to suit New Zealand conditions and transfer to New Zealand industry in the form of better products and services.



Like most other New Zealand companies, IRL needs to be an exporter. The New Zealand market for our products and services is a limited one and selling overseas is vital to IRL's business success.

When it comes to commercialisation, international connections are also important. While much of the intellectual property (IP) generated by IRL is picked up by New Zealand companies, in some cases we do not have the specialty manufacturing capability here that we need to turn those ideas into commercial products. The revenue generated by licensing some of our science overseas comes back to New Zealand, where it can fund further research that could be of direct benefit here.

IRL has world-class expertise in certain areas, which means we can make a major contribution to the global scientific research effort through collaboration with research institutions in other parts of the world. By collaborating, we can also broaden our research into new areas and get access to new funding that would not be open to us otherwise.

### + New healing treatments from waste

A partnership between IRL and Meat and Livestock Australia is converting red meat processing waste into high-value bioactive products for wound healing and joint care.

IRL scientists have been researching the extraction of beneficial compounds from animal tissue in the extracellular matrix (ECM), the host environment for cells. Industrial Research biochemist Keryn Johnson says the ECM makes up around 80 per cent of the waste from red meat processing and contains potentially valuable compounds with growth, healing and anti-inflammatory properties.

A wound care gel and a joint care nutraceutical have been developed and initial testing has confirmed their beneficial properties. IRL has also developed a purification process and pilot-scale manufacturing is underway to determine the viability of commercial production.

The collaboration, which began in 2002, gives Meat and Livestock Australia opportunities to improve returns to farmers who fund its research, using IRL's expertise in natural product wound healing. The partners have so far co-invested around \$500,000 in the research and share ownership of the intellectual property.

"Both Australia and New Zealand have disease-free animal status, meaning extracts from our meat products are safe and sought after around the world. Our goal is to have the technology available in both countries, to ensure greater certainty of supply," says Keryn Johnson.

### + Enzyme inhibitors – the new approach to disease treatment

IRL's Carbohydrate Chemistry team has renewed for another 10 years its collaboration with its long-term partner, Albert Einstein College of Medicine in New York. The collaboration is pursuing new ways to design and synthesise enzyme inhibitors, building on work done with Albert Einstein College of Medicine since 1994. Enzymes are everywhere, from laundry detergents to the thousands of different enzymes that enable the human body to function, but some enzyme processes can result in diseases such as some cancers, arthritis, and psoriasis. They can, however, be controlled by enzyme inhibitors which stop the enzyme in question from "processing" or functioning in much the same way we can stop a door lock from functioning, by breaking off the key in the lock.

While the initial collaboration with Albert Einstein College of Medicine was with Professor Vern Schramm of the College's Department of Biochemistry, the collaboration has now been extended to include another member of the department, Professor John Blanchard. He is exploring enzyme inhibitors as a treatment for tuberculosis to overcome the problems posed by antibiotic-resistant strains of *Mycobacterium tuberculosis*.

### + Towards the hydrogen economy

The emphasis worldwide on finding an alternative to fossil fuels has raised interest in hydrogen as a clean, cost-effective alternative and IRL is linked into several international efforts to make this a reality. The work focuses on materials that can be used to store hydrogen and, in particular, for small, light, storage systems suitable for hydrogen-powered vehicles.

New Zealand is a member of the International Partnership for the Hydrogen Economy ([www.iphe.net](http://www.iphe.net)), giving us contacts into the international hydrogen energy research community.

One collaboration that has resulted is with two US Department of Energy laboratories – Pacific Northwest National Laboratory (PNNL) and Los Alamos National Laboratory (LANL). They have been principal partners in the IRL hydrogen storage materials programme for several years and during the 2007/08 year, IRL researcher Mark Bowden spent six months working at both laboratories developing new materials and methodologies for high-energy density storage materials.

Another significant collaboration is with Professor Ping Chen of Singapore University – a leading hydrogen storage researcher.

IRL researchers also have a strong working relationship with one of the world's leading materials research institutions, the Department of Materials at Imperial College, London. Over the past four years, eight Master of Engineering students from the College have undertaken research internships at IRL, providing highly skilled and enthusiastic support for key materials projects here.

### + Boosting the performance of HTS wire

IRL's research group on enhanced HTS wire was earlier this year invited to join a prestigious US-based grouping – the Wire Development Group (WDG). Formed in 1991, this is a collaborative group focusing on the materials science behind HTS wire technology. It brings together world-leading superconductivity researchers from Los Alamos, Oak Ridge and Argonne National Laboratories and from the University of Florida State and the University of Houston along with representatives from American Superconductor Corporation (AMSC) – a major HTS wire manufacturer. IRL's involvement originates with its long history of successful collaboration with AMSC, beginning with the signing in 1992 of a licensing and R&D contract agreement with the company.

The Group meets around three times a year, with web-based meetings used in the interim. It has in place a formal non-disclosure agreement to ensure discussions are open and collaboration is encouraged.

Wire process research and development to improve HTS wire capability is still vital to ensure the full

penetration of HTS technology into the global power industry. For instance, the US Department of Energy has set performance targets including that the current-carrying capacity of the wire needs to increase by as much as a factor of four over the next six years if all the potential commercial applications are to be realised. The Wire Development Group and its activities are critical to the global industry meeting these targets.

New Zealand's membership of the Group is an endorsement of IRL's reputation as one of the world leaders in HTS research.

### + Promoting the Synchrotron in New Zealand

As well as carrying out her own research at IRL, scientist Bridget Ingham is responsible for co-ordinating New Zealand's use of the Australian Synchrotron as Technical Director of the New Zealand Synchrotron Support Programme. Eleven New Zealand research organisations – universities and Crown Research Institutes, including IRL – are members of the New Zealand Synchrotron Group through their shareholding in the Synchrotron, which is located near Melbourne.

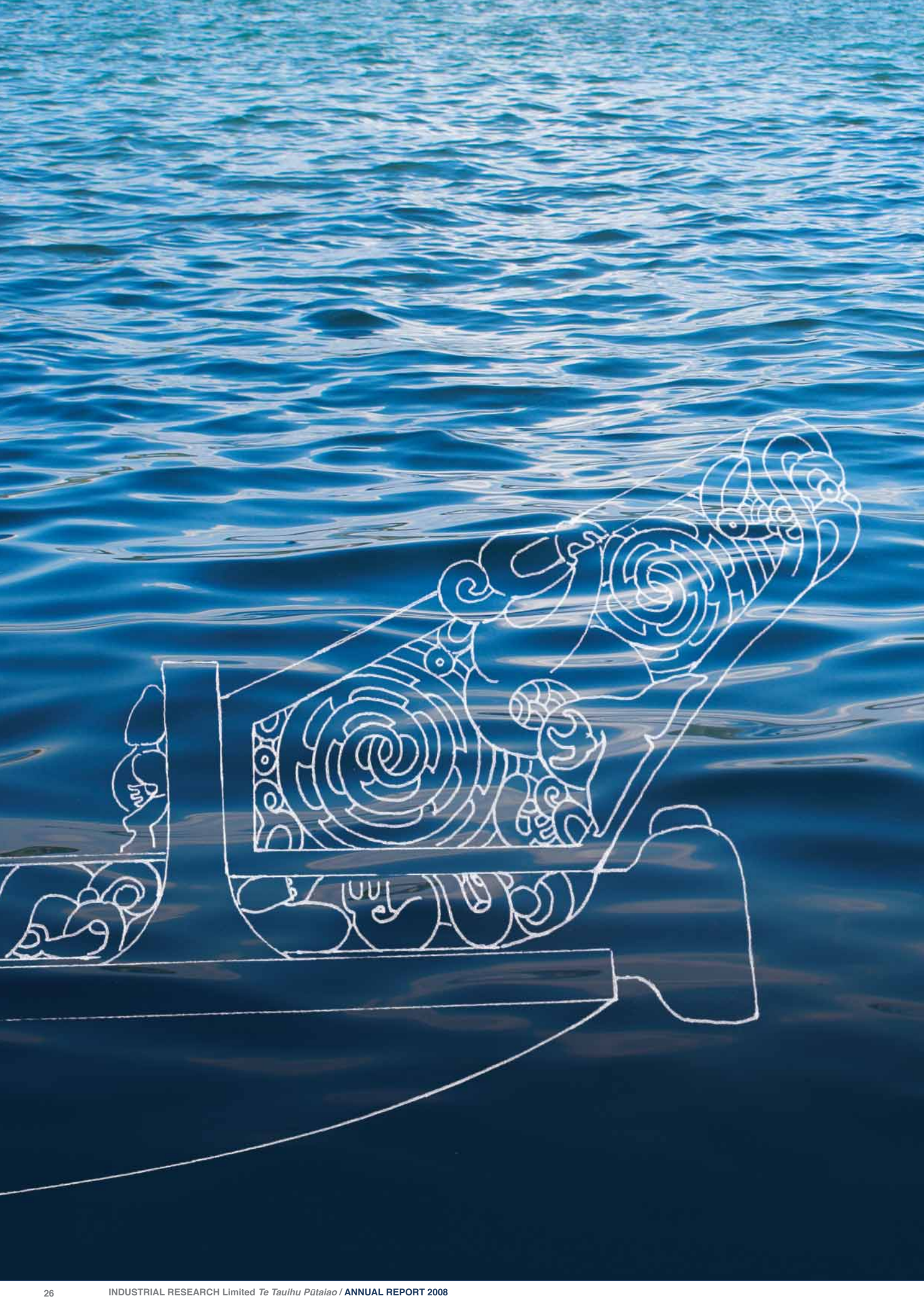
Bridget says her part-time role is to see New Zealand researchers get the most out of this important piece of research infrastructure.

"Synchrotrons have so many applications in the life sciences, environmental science, chemistry and physics. They can be used for investigating the composition of materials through to developing new ways to treat and diagnose cancers."

Bridget is highly experienced in the use of synchrotrons in her research specialty, exploring the properties of materials, including nano-sized materials. During 2006/07, as an IRL post-doctoral researcher, she was based at the Stanford Synchrotron Radiation Laboratory, operated by Stanford University for the US Department of Energy.



*IRL Research Scientist Bridget Ingham mounts a flow cell in place for the first general user experiments using the powder diffraction beamline at the Australian Synchrotron.*



# + Te Taihu Pūtaiao

## Leading-edge science for New Zealand

IRL has adopted a Māori identity that symbolises the leading-edge work we do to change New Zealand.

Te Taihu Pūtaiao literally translates to “the prow of science”. The prow is the cutting edge of the waka as it is rowed into new and often uncharted waters.

The waka itself embodies centuries of knowledge applied in its construction and use: knowledge of materials and engineering; of navigation and astronomy; and of harnessing forces. The crew, working in harmony, propel the vessel towards a newer world.

Just as the voyages of discovery of Polynesian vessels through the Pacific opened up new opportunities – such as Aotearoa – IRL science and engineering open up new economic opportunities for New Zealand and its industry.

## Te Taihu Pūtaiao

two cultures come together to  
celebrate discovery and the  
application of knowledge



Shaun Coffey / Chief Executive

## + The IRL Board

### + Michael Ahie *BBS (Hons), MInstD*

Michael Ahie is a business owner and company director based in Wellington.

He is a founding partner of business coaching company, Shirlaws New Zealand Limited and a director on the international board of Shirlaws. He is currently a director of The Bio Commerce Centre Limited (a business incubation company), Manawatu Investment Group Limited (an angel investment fund) and Clearwater Limited (a privately owned consulting company). He completed the Executive Development Programme at The Wharton School, University of Pennsylvania, and received a First Class Honours Degree from Massey University. Michael brings to IRL broad international business and governance experience with multinational companies in sales, marketing, global strategy and business unit management. This included senior roles with Toyota New Zealand Limited, the New Zealand Dairy Board and Wrightson Limited. He understands the dynamics of a global marketplace, and New Zealand's place within that marketplace, and is passionate about the role IRL can play in raising the competitiveness of New Zealand companies.

### + David Henry *BCom, CA*

David Henry is a professional director based in Auckland. From 1975 to 2001, he worked for Fisher & Paykel. He was appointed Chief Financial Officer in 1987 and an executive director in 1992. He is currently the chairman of Androgenix (a biotech start-up company) and a director of Henry Manufacturing, Keratec and Klein Medical, where research and development plays a major role. David brings commercial expertise to the IRL Board from his years as an executive director at Fisher & Paykel and, more recently, as a director of a number of start-up R&D companies. His role as an executive director at F&P

included hands-on involvement in all aspects of the business from strategy, manufacturing and product development through to marketing and sales. This experience was across the appliances, healthcare and finance company sectors of the business and included establishing F&P's international operations. David is a chartered accountant and a Fellow of the Institute of Directors in New Zealand.

### + Anita Mazzoleni

*BCom, LLB, CA, Barrister & Solicitor (NZ)*

Anita Mazzoleni is an independent corporate finance advisor based in Auckland. She provides corporate finance and funding advice to New Zealand corporates and central and local government entities in New Zealand and the Pacific. Anita has had a commercial career in industry and finance, focusing on the evaluation and funding of infrastructure projects, particularly in the energy sector, and emerging businesses in the life sciences sector. Anita has previously held senior roles at Contact Energy, Citibank, and Deloitte and is currently an associate commissioner with the Commerce Commission, assisting the Telecommunications Commissioner.

### + Ian Parton *BE, PhD*

After a career in engineering management, Ian Parton is now an independent company director based in Auckland. He was Managing Director of Meritec Group Limited from 1987 to 2002 and a founding director of Tanlaw Limited, chairman of Bendon (formerly Ceramco) until its privatisation, and a Trustee of St Cuthbert's College for eight years. He is currently deputy chairman of Watercare Services Limited, chairman of HTS-110 Limited and chairman of VT Fitzroy Limited. Ian is a chartered professional engineer and a Distinguished Fellow of the Institution of Professional Engineers New Zealand.



IRL Board and Executive Management team (from left to right): Ian Parton, Jeff Lycett, Michael Ahie, Barry Marlow, Maxine Simmons, Shaun Coffey, Craig Stobo, Brian Rhoades, George McIrvine, Anita Mazzoleni, David Henry, Suki Siriwardena.

### + Brian Rhoades

**CHAIRMAN** *BE (Hons), PhD*

Brian Rhoades has broad experience over a number of years as a business advisor and company director and chairman based in Nelson. His background is in mechanical engineering and materials science and he is a Fellow of the Institution of Professional Engineers New Zealand. Brian's experience as director or chairman spans a wide range of industrial, food processing and export companies. These have included Cold Storage Nelson, Forestry Corporation, NIWA, Grocorp Pacific, Salmond Smith Biolab, Port Marlborough, Trustbank Canterbury, Nelson Millennium Centre Trust, Waitaki Biosciences, and Extract Solutions. He initially worked as a lecturer in production management and materials science at Canterbury University before holding management positions within the AHI/Carter Holt Harvey Group. He was chief executive of Sealord Products from 1985 to 1994. He currently chairs the Council of the Nelson Marlborough Institute of Technology and Nelson Electricity Limited and is a Tertiary Education Commissioner.

### + Maxine Simmons *MSc (Hons)*

Maxine Simmons is a pioneering biotechnology entrepreneur, currently running a business consulting company focused on advising early stage biotechnology ventures. After graduating with an MSc in biological sciences from the University of Auckland, she co-founded one of New Zealand's first biotechnology companies. The New Zealand biotechnology industry recognised this achievement by awarding her the Distinguished New Zealand Biotechnologist Award in June 2000. Maxine brings to IRL the understanding of the commercialisation of science gained through her experience with her own companies as well as through previous membership

of Investment Committees including Technology New Zealand, the Foundation for Research, Science and Technology (Board member) and as a founding director of Industry New Zealand (now New Zealand Trade and Enterprise). She is currently a member of the Royal Society of New Zealand's Biotech Learning Hub, the New Zealand Biotechnology Association's (NZBio) Advisory Committee, and the Institute of Directors in New Zealand. She is also a director of one of the Centres of Research Excellence – the Maurice Wilkins Centre for Molecular Biodiscovery – and a managing director of BioCatalyst Limited.

### + Craig Stobo

**DEPUTY CHAIRMAN** *BA (Hons)*

Craig Stobo is an independent company director and entrepreneur. He has worked as a New Zealand diplomat, economist, investment banker, fund manager and management executive. He was CEO and Director of BT Funds Management NZ Limited, an investment management company he was instrumental in establishing in 1992. While under Craig's leadership from 2000 to 2004, BT was awarded Fund Manager of the Year twice and was named Best Place to Work in New Zealand. In 2004 he chaired the tax review, Towards Consensus on the Taxation of Investment Income, on reforms for the New Zealand savings and investment industry. He is chairman of AMP Multiplex Limited (the management company for the listed trust AMP NZ Office Trust), chairman of OCG Consulting Limited (an executive recruitment company), a director of Fisher Funds Limited (an investment management company), and a director of Stobo Group Limited and A H Stobo Limited, both privately owned companies.

*On 1 July 2008, Catherine Drayton – a chartered accountant and angel investor – was appointed director, replacing Anita Mazzoleni. Maxine Simmons joined the Board in September 2008.*

## + IRL Executive Management team

There were several changes in the Executive Management team during the year.

Wynn Ingram – who was seconded to the position of General Manager Commercialisation and Business Development from the Ministry of Research, Science and Technology – returned to his position at the Ministry and Suki Siriwardena was appointed to that position.

George McMeel, General Manager Science and Technology left IRL in 2007 and was replaced by Barry Marlow.

### + Shaun Coffey

Chief Executive

*MAgrSc, G Dip Chg Mgmt, G Dip CD, FTSE, Comp IPENZ, FAIM, FAICD*

Shaun Coffey has had extensive involvement in leading research and development enterprises in Australia and New Zealand. An agricultural scientist by training, his recent interests have included the application of complex systems science and the redesign of annual agriculture systems. Shaun joined IRL from CSIRO Australia in 2006 and has focused on returning the company to its core purpose and restoring fundamental stability. Among his honours and awards, Shaun is a recipient of the Silver Medal of the International Federation of Agricultural Journalists (2001) and a Centenary Medal of Agriculture from the University of Melbourne (2006). He was elected a Fellow of the Australian Academy of Technological Sciences and Engineering in 2004 and a Companion of the Institute of Professional Engineers New Zealand in 2008.

### + Suki Siriwardena

General Manager Commercialisation and Business Development

*BSc (Hons), PhD, MBA*

Suki Siriwardena is responsible for IRL's interaction with industry and for ensuring these companies have access to timely and appropriate research and development that adds value to their business. She is also responsible for effective commercialisation of innovative intellectual property developed by IRL, some of which leads to the development of new industries for New Zealand. Her initial training was as a research scientist and her first job was at IRL's predecessor organisation, DSIR Industrial Processing. Suki then completed her MBA and moved into the international business development area. Her experience includes a three-year stint as New Zealand Trade Commissioner to Indonesia and she headed the Trade NZ team in Taiwan. She has also had first-hand experience of start-up companies as General Manager Business Development with a small e-commerce business. Suki came to IRL from the Foundation for Research, Science and Technology, where she had several roles including Manager TechNZ and Director Commercialisation.

### + Barry Marlow

General Manager Science and Technology  
*BE (Hons), PhD*

Barry Marlow is responsible for managing all the science and engineering activities at IRL. Barry is an electrical engineer by profession and his R&D career encompasses weighing and grading technology for the meat industry, computer control and instrumentation in the dairy industry, machine vision, microelectronic design, and sensing technology. He managed groups in electronics, sensors and communications over a 40-year career before taking up his current position in January 2008. In 2001, Barry was awarded a Royal Society of New Zealand Science and Technology medal in recognition of his significant contribution to the development of microelectronics in New Zealand.

### + George McIrvine

General Manager Corporate Services  
*ED, BBS, CA*

As General Manager Corporate Services, George McIrvine is responsible for the group that provides services to all the science, business support and corporate teams in IRL. These services include Information Technology, Information Services, Site Services, Human Resource Services, Health and Safety, and Finance. He also holds the Chief Financial Officer role within IRL. George was born in Aberdeenshire, Scotland and is a qualified accountant (CA), with extensive systems and company exposure in auditing with the public and private sector. He then moved to company accounting, where he held a number of roles before joining HortResearch as Business Accountant in 1996. There he was part of the teams that commercialised Zespri Gold, concluded the sale of their share of the Time Capsule business and implemented SAP. A move to Massey University in 2003 as Accounting Advisor to the College of Sciences saw him pick up the role of Acting CFO with the Massey Ventures Group of Companies. This was a role he held up until joining IRL in May 2007. He currently holds the rank of Major in the Territorial Army in both the UK and New Zealand, having been commissioned in the British Army at Sandhurst.

### + Jeff Lycett

Executive Officer  
*BA (Hons)*

Jeff Lycett's position as a member of the IRL Executive comprises two elements. As Executive Officer, he is required to provide professional support, sound and well-reasoned advice and practical assistance to the Chief Executive Officer in the planning, execution and achievement of IRL's strategic and operational objectives, in the management of the business of the office of the CEO, and in the management of change programmes. As Board Secretary, he provides administrative services to the Board, Board committees and nominated subsidiary and associate companies. Jeff's background is mainly in the Human Resources area. He was previously General Manager with the New Zealand Dairy Board (now Fonterra) and with the Electricity Corporation of New Zealand (ECNZ). More recently he has carried out consultancy assignments with the Ministry of Agriculture and Forestry, New Zealand Post and EDS.

## + IRL is people

The business environment within which IRL operates is continuously evolving. That poses challenges for IRL in its role of using world-class research and advanced technology to transform industry and add value to the New Zealand economy.

To meet that challenge, IRL as an organisation needs to be at the forefront of scientific and technological innovation and to provide robust leadership across the industrial sector. A comprehensive staff development and training programme is essential to achieving this, as is a remuneration system that recognises and rewards performance.



### + Leadership Development Programme

In 2007/08, IRL introduced an intensive programme to develop the leadership potential of staff across the company. The course is open to all staff and in its first year 32 employees have taken part.

The programme includes two intensive courses: one helps participants learn more about themselves and come up with a personal development plan; the other – in conjunction with Victoria University of Wellington – covers a range of business skills. The third component is individual training with ongoing coaching and mentoring. As part of the programme, participants are required to appear before a “Dragon’s Den” of leading business and scientific minds to present an innovative business proposal for IRL. More programmes of this nature have been planned to continue developing staff potential within IRL.

### + Performance-linked remuneration

IRL provides employees with market-competitive remuneration through an effective remuneration system introduced in the current financial year.

Our remuneration system is based on current market information received from a reputable remuneration survey and on recommendations by an employee-driven working party. The system incorporates three major factors: current market data; individual (staff) performance; and organisational affordability.

The system reinforces and rewards good performance and encourages competency development through a well-aligned performance planning structure. It is supported by an established process for career progression. This creates a positive and encouraging environment with opportunities for employees to optimise their potential and be rewarded fairly. Higher performance and contribution lead to higher rewards.

### + Learning and development – staff support and coaching

Our performance planning system encourages all employees to create their own development plan and take advantage of the variety of training courses on offer, including some that have been introduced in the 2007/08 year. Coaching is

regarded as a vital part of continuous learning. Highly skilled colleagues at IRL provide new and existing employees with rich sources of experience and knowledge.

With more staff being recruited from overseas, we are currently trialling courses to assist overseas staff in consolidating their language and communication skills. IRL also has formal policies to manage this diverse workforce to ensure that all staff are safe and feel at home in the workplace. More recently we have been extending our support for our overseas staff to include settlement support services for employees and their families on their arrival in New Zealand.

IRL also has a well-established employee assistance programme available to all staff.

## New Ideas

IRL’s Leadership Development Programme has already thrown up some good ideas that are being adopted within the Company.

One example is the monthly CEO seminar series. This is aimed at improving IRL’s engagement with industry and encouraging discussion across the company on issues of strategic importance to New Zealand by having a guest speaker present on a topic of relevance to IRL research and development.

Shaun Hendy – who organises the series – says that, in choosing speakers, he draws on the considerable expertise inside IRL, but also likes to include guest speakers from outside the company. “By including external speakers as well we can ensure we get a reality check from time to time about issues affecting IRL.”

Speakers to date have included Professors Paul Callaghan and Sally Davenport from Victoria University of Wellington, Genesis Energy CEO Murray Jackson, and IRL Research Scientist Jason Ryan.

## IRL – a good place to work

The wellbeing of employees at IRL is fundamental to IRL's organisational culture. As a good employer, IRL recognises the importance of work/life balance to employee wellbeing. To accommodate this, IRL has provision for job sharing, part-time and flexible working hours and, where practicable, provision for working from home.

An annual staff survey allows us to obtain feedback from employees on a range of important issues, providing data that feeds into our human resources policies and practices.

### + Cultural diversity and Equal Employment Opportunities

IRL is committed to the principles of the Good Employer Programme, which values equality and fairness and requires staff engagement through employee consultation. The Human Rights Commission has identified seven key areas where policies and practices should be introduced to promote Good Employer principles. We have formal policies and informal practices and/or programmes in place for the following:

- leadership, accountability and culture
- recruitment, selection and induction
- employee development, promotion and exit
- flexibility and work design
- remuneration, recognition and conditions
- harassment and bullying prevention
- safe and healthy environment.

As part of our commitment to being a Good Employer, IRL has an Equal Employment Opportunities programme in place and available to all employees. We give special regard, where practicable, to those groups often overlooked or marginalised – including women, Māori, other ethnic communities, people with disabilities and other minority groups.

Overall, our aim is to foster an organisational culture that wholeheartedly embraces inclusiveness. In doing so, we want our scientists and support staff, irrespective of cultural or ethnic background, gender, skills and abilities, lifestyles and perspectives, to be able to contribute optimally to the organisation's success.

The Human Resources team strives to ensure that occupational hazards are minimised so that all staff can enjoy a safe work space that is conducive to productivity through the provision of quality occupational health services.

### + Awards and staff achievements

During the 2007/08 year, three IRL scientists were promoted to the position of Distinguished Scientist – the top grade in the career path for science staff. Rod White received the promotion for his considerable achievements in thermometry, in terms of its application within industry as well as research that has had an impact on the fundamentals of the international standards relating to temperature. Tim Haskell was recognised for his work in Antarctica (see story below) and in optical research. Peter Tyler received the recognition for his design and synthesis of new biologically active carbohydrate molecules, including the discovery of compounds that block T-cell proliferation (a discovery that subsequently brought in more than \$6 million in royalty payments to IRL), a new anti-cancer compound that alters important gene expression in tumour cells, and a potential new type of anti-bacterial control that works by blocking bacterial quorum sensing.

**Tim Haskell**, Measurement Standards Laboratory, was awarded the Royal Society of New Zealand's 2007 Hector Medal for physical sciences for his outstanding contributions as a leader of, and advocate for, several novel New Zealand research programmes, particularly the New Zealand Antarctic Research Programme. He also received the Antarctic Medal in the 2008 New Year's Honours for his contribution to Antarctic science.

**Nicola Gaston**, post-doctoral nanotechnologist with the Applied Maths team, was awarded a Foundation for Research, Science and Technology Post-Doctoral Fellowship to further her work in developing techniques using mathematical modelling and simulation to understand the surface chemistry of materials.

**Ruth Falshaw**, Research Scientist in Carbohydrate Chemistry, was awarded a New Zealand Federation of Graduate Women Professional Development Scholarship. The scholarships are awarded annually to women in the science workforce who are interested in a course in management training.

**Lai Yeap Foo**, Senior Research Scientist in Integrated Bioactive Technologies, received an award for his work on identifying the chemical compounds in the cranberry that support urinary tract health. His research has resulted in soaring global demand in cranberry-based products and the establishment of cranberry growing in New Zealand.

**James Storey**, a post-doctoral research fellow working in the area of high temperature superconducting was one of only two young New Zealand scientists selected to attend the 2008 Lindau Nobel Laureate meeting in Germany. Around 20 Nobel Prize winners attend the meeting, where young researchers and graduate students from around the world have a chance to mingle with the Laureates and attend formal lectures and informal group discussions.

**Conrad Lendrum**, Research Scientist in nanotechnology, was one of three young New Zealand researchers selected to meet leading scientific figures, including five Nobel Laureates at the inaugural HOPE meeting in Japan in February. The meetings are a new venture funded by the Japanese Society for the Promotion of Science, with the aim of bringing together young scientists from the Asia-Pacific region with leading scientists from Japan and around the world. The theme of the first meeting was nanotechnology and it was held at Japan's Tsukuba city – a purpose-built science city that is home to some of Japan's most important research institutes and universities.

**Shaun Coffey**, Chief Executive of IRL, was elected a Companion of the Institution of Professional Engineers New Zealand. IPENZ Companions are people whose qualifications are not in engineering, but who have obtained a position of responsibility where they have significant interactions with the engineering profession.

**Andrew Dawson** of Imaging and Detecting won best student paper in the "Best Student Presentation" category at the 2007 Electronics New Zealand Conference held in Wellington last November. **Derek Richardson** of Imaging and Detecting was highly commended in the "Best Written Paper" category at the conference.

## Tim Haskell's Antarctic research

Tim Haskell's association with Antarctic research has spanned 30 years and during that time he has worked with researchers from a range of research organisations from New Zealand and overseas.

He first went to Antarctica in 1978, when it was decided by the Ross Dependency Research Committee that more of the physical sciences should be included in the New Zealand Antarctic research programme. Along with then-colleague, Bill Robinson, his interest was in the engineering aspects of roads and runways on sea ice. In the 1990s his interest turned towards the interaction of the sea ice with the Southern Ocean, especially how sea ice grew and was then broken up by ocean waves. In recent years the programme has broadened to include NIWA oceanographers as well as the Universities of Otago and Victoria and is now targeted at determining the relationship between sea ice and climate.

Until recently, Tim has been the chief advisor to the Minister of Foreign Affairs and Trade on Antarctic environmental matters, including measures to protect Antarctic and Southern Ocean bird and other life from the impact of fishing in the region, the evaluation of the impacts of New Zealand's research programme on Antarctica and the Southern Ocean, and the permitting and evaluation of tourist operations, either departing from New Zealand or involving New Zealand personnel.



*Mt Erebus looms over Camp Haskell in Antarctica, where a multinational research team is studying sea ice and its impact on climate change. The camp was named after Tim Haskell by a graduate student in the 1990s. Photograph by Dave Cochrane.*

## Encouraging the next generation of scientists

IRL places great importance on promoting and encouraging the next generation of scientists. It does this in a range of ways.

### + Summer student programme

The IRL summer student programme gives around a dozen graduates a chance to spend up to 14 weeks working at IRL over the summer vacation. In 2007/08, graduates assisted our scientists and engineers in a range of IRL science and engineering projects. Some of IRL's leading scientists have come to the Company through the summer internship programme. The summer student programme has been reviewed and in the new financial year changes are being made to ensure the programme is attractive to the very best science students in our universities.

### + Tertiary education careers days

New Zealand university and tertiary institution career days are an important part of IRL's recruitment programme, providing a chance to showcase IRL's science and engineering to the next generation. In 2007/08, we attended seven careers days. These events have been effective in increasing registrations for places in the summer internship programme.

### + Sponsorship

#### **MacDiarmid Young Scientists of the Year**

**Awards** – this prestigious awards event recognises excellence and innovation in New Zealand's top young researchers. IRL was a Silver Sponsor in 2007.

**Realise the Dream** – this awards programme showcases the work of extraordinary school students from all over New Zealand who have carried out an excellent piece of research or technological practice. In 2007, the Industrial Research Limited Award for the "Most Commercial Idea" was won by 15-year-old Michael Suisted of Te Aroha College for his innovative and environmentally friendly process for securing polythene covers to silage stacks. Michael receives a \$1,000 education scholarship.

### + WorkChoice Trust Day

IRL was a participant in the 2008 WorkChoice Trust Day, hosting 35 students from St Patrick's College, Silverstream and Samuel Marsden Collegiate in Wellington. During the day, selected sixth form (Year 12) students from various schools visited businesses around the country to get a better understanding of the career paths open to them when they leave school.

### + Futureintech

IRL is a partner in Futureintech, a government-funded initiative of the Institution of Professional Engineers New Zealand (IPENZ), which promotes careers in technology, engineering and science within schools. IRL's nine Futureintech ambassadors are young scientists – men and women – who visit local schools to talk about the life of a researcher and the career opportunities available in science and technology.



*"Realise the Dream" students visit IRL's chemistry labs.*

## + IRL is science and engineering

Each year, the Crown Research Institutes receive Capability Funding through the Ministry of Research, Science and Technology to support and enhance long-term research capability. In 2007/08, IRL received \$6.014 million and used it to fund a total of 20 projects.



Around 40% was used in projects that maintain and enhance our internationally recognised capability in:

- advanced clean energy technologies
- supercritical fluid extraction
- carbohydrate chemistry
- smart material design and performance.

Another 49% went towards developing internationally recognised capability in the new and emerging areas of:

- materials science for the storage and generation of hydrogen energy
- high temperature superconductor magnet, coil and power systems equipment design
- microfluidics modelling and device design (microfluidics is the study of the behaviour, precise control and manipulation of fluids that are geometrically constrained to a small, typically sub-millimeter, scale)
- advanced organic materials for photonics (the science of the emission, transmission, amplification, detection, modulation and switching of light)
- imaging and detecting using optics and ultrasound technologies for medical application, and in particular developing sensors for disease diagnosis at the molecular level
- assistive medical science bringing together existing capability in vibration science, human motion measurement and control and biomechanical modelling to enhance the independence of those with physical disabilities and for physical rehabilitation programmes and diagnostics
- information and communications technologies and, in particular, wireless and audio/acoustic technologies and optoelectronic devices and materials (optoelectronics is the term given to devices and/or materials that either produce light or use light in their operation, such as the light-emitting diode or LED).

The remainder (11%) went towards new fundamental scientific and technological research in the following areas:

- research to support an international effort to redefine the international measurement

standards regime, the International System or SI, by basing it on a small set of fixed fundamental constants of physics

- research into new materials for spintronics (technology that makes use of the spin state of electrons and has the potential to open the way for major technical advances in the sensitivity of electronic devices such as sensors but at less cost)
- mathematical modelling research to evaluate and optimise the properties of advanced materials.

More detail on the research funded by the Capability Fund and progress during 2007/08 is contained in the table on pages 41-46.

## + Analysing fungi

Capability Funding is allowing natural products chemist Stephen Tauwhare to understand the chemical composition of indigenous fungi and whether they contain any bioactive compounds that could have applications in nutraceuticals or cosmeceuticals.

Aided by local hapū and iwi, Stephen has collected around 40 fungi species from the Mt Aorangi/ Awarua area of the Ruahine ranges and from Te Taumatawhakatangihangakoauauotamateaturipuka-kapikimaungahoronukupokaiwhenuakitanatahu (or Te Taumata for short) near Porangahau in the Hawke's Bay. Several of them are fungi that would have been used by Māori in the past as a food source (kai) or a medicine (rongo).

After all the species Stephen has collected have been identified (with the help of Landcare Research scientist Peter Johnston), he will extract lipids, small molecules (such as steroids, proteins and terpenes), and nucleosides and polysaccharides from them to see if they have any biological effects that could be useful in novel or therapeutic food products. The local iwi and hapū will be kept informed and involved throughout the project, with the ultimate aim being to open up new business opportunities for them in large-scale fermentation or cultivation of any species that have economic potential.

This project also plays a significant role for IRL in developing relationships with a wider audience including whānau, hapū and iwi and different Māori Land Trusts. IRL's relationships with groups such as these will bear fruit for IRL in the future and continue to create opportunities for economic development in New Zealand communities.

### + Capturing carbon dioxide

CO<sub>2</sub> capture from large emitters of greenhouse gas, such as coal- and gas-fired power stations, is one approach to mitigating human-induced climate change. The problem is that current CO<sub>2</sub> capture technology is very expensive and energy-hungry, with an estimated 25% additional fuel being required in a coal-fired plant and 15% in a gas plant.



*Research Scientist Robert Holt with IRL's CO<sub>2</sub> capture technology.*

Capability Funding is helping IRL researchers develop a much more cost-effective technology that captures carbon dioxide while it is relatively concentrated, meaning there is less waste from the process and the CO<sub>2</sub> is much more easily managed for later sequestration. The technology also has the advantage that it could be retro-fitted to existing plants as well as being integrated into new ones. It could be used by cement, steel and chemical manufacturing plants as well as electricity generators using fossil fuels. The system has been designed to capture CO<sub>2</sub> either pre-combustion (as in a gasifier producing syngas or hydrogen), or post-combustion (in an exhaust flue). An added benefit is that this process can also capture polluting sulphur gases.

### + Exercising mind and body

Researchers at IRL in Christchurch have been working with health professionals specialising in brain injuries to develop a rehabilitation programme which uses computer games as the basis for an exercise programme. Capability Funding has allowed the researchers, in collaboration with University of Canterbury virtual reality researchers, and University of Otago medical researchers, to develop several programmes that use the games to motivate the patients to continue their exercises. The games will be linked to an exerciser that can assist or resist arm movements, depending on the capabilities of the player. The programmes will provide feedback to the medical team on how the patient is progressing.

Because the games are relatively simple, they could be accessed by patients at home using the internet. One, in which the player has to catch virtual butterflies, was trialled by four people who had suffered severe strokes. Two showed an impressive improvement in their range of movement and the leader of the project, Marcus King, says the next step is to undertake wider clinical trials.

### + The future needs of HTS

An important aspect of HTS research at IRL has been ensuring New Zealand captures the benefits of this emerging technology. To this end, Capability Funding was earmarked to begin the process of building capability to design and manufacture equipment for the global electric power industry.

First, a contribution was made to a project to design and fabricate, with New Zealand partners, an HTS transformer. This involved the University of Canterbury – which provided the support of a Master of Engineering student and a PhD student – ETEL Transformers, Vector Networks, and international consultations.

A second project has been to test HTS rotors for a high-speed generator. This is being undertaken in partnership with US company, Long Electromagnetics Inc and the US Air Force. The testing is being done by another US firm, the Balancing Company. The outcome, if successful, will be the opportunity to design and build a full demonstration HTS generator in New Zealand.

Capability Funding also went towards preliminary work on setting up two graduate HTS programmes at the University of Canterbury – one within the Master of Engineering degree, the other a PhD qualification.

## + Next-generation technologies

Research projects targeted at the development of cutting-edge, advanced sensors, along with novel devices for the ICT industry, are underway on the back of knowledge gained using Capability Funding.

Research Scientist Grant Williams says the funding propelled IRL to a position where it could successfully bid for investment from the Foundation for Research, Science and Technology (FRST) to take a number of initiatives to the next level.

In the field of spintronics – spin transport electronics – IRL is working with international partners to develop advanced magnetic field sensors for new devices for the ICT, energy, non-destructive testing, biomedical and security industries. The sensors will use a new class of novel materials that take advantage of the “spin” of the electron to produce small, sensitive magnetic field sensors which could not be made with existing materials.

Grant Williams says the team is targeting the mid-range market, with sensors that are affordable for inclusion in a range of devices such as ultra-stable current supplies, position and speed sensors, high spatial resolution imaging devices for testing electronic components, remote sensing devices for security screening and ultra-fast optical switches.

The sensors could be highly effective for non-destructive testing of structures like aircraft and bridges to identify cracks both on the surface and within the construction materials.

Scientific knowledge built up with the Capability Funding has also helped secure FRST funding for a research project in photonic imaging and sensing which aims to use advanced glasses, glass-ceramics and non-linear optics to create next-generation technology for the global sensors and security screening market.

Another project to benefit from knowledge gained using Capability Funding includes IRL's development of novel devices for all-optical switching and signal processing, which are critical for eliminating bottlenecks that limit data transfer in current fibre optic networks as well as minimising power consumption.

Grant Williams says Capability Funding is also helping an IRL/Victoria University collaboration researching improved ways of measuring levels of radiation exposure in staff operating equipment like X-ray units or other sources of ionising radiation.

## + Skin imaging

It has been known for a number of years that laser speckle images of skin contain information on blood flows within the dermis – the blood-rich layer of skin one to two millimetres thick that encases the body. However, the technique has never been widely used because there were problems in presenting the data in a form that physicians could interpret.

Using the Capability Fund, IRL has devised a method for converting the data from speckle images into a form that can be interpreted by doctors. Furthermore, the speeds of modern cameras and computers allow the images and the information they provide to be displayed in real time. This has allowed the researchers to detect the pulse fluctuations in tiny capillaries within a millimetre of the skin's surface and they have found that individuals seem to have characteristic response patterns.

Now the IRL researchers, in collaboration with Middlemore Hospital, are exploring laser speckle imaging of blood flow in the skin to predict circulation problems that lead to ulcers in patients with diabetes – a diagnosis that until now has been based on analysing blood flow through the arteries deep in the body and which may have little to do with diabetic skin problems.

## + Advances in nanotechnology

A research team of Brent Walker, Shaun Hendy and Dmitri Schebarchov, working on the Nanoparticles and Quantum Dots project, have used advanced computer simulation techniques and mathematical modelling to study the properties of nanoparticles as functions of their size, as well as their composition and the additional surface attachments which can transfer novel properties to nanoclusters.

This project investigated the properties of metal and semiconductor nanoparticles, which have potential applications in the medical device sectors. The very high ratios of surface area to volume mean the properties of nanoparticles are strongly influenced by their size. This applies particularly to the optical properties of the smallest semiconductor nanoparticles, also known as quantum dots.

The novel properties and processes discovered by the research team generated considerable international interest when they were reported in the scientific literature.

## + Capability Fund

Capability	Areas of activity	2007/08 forecast	2007/08 achievement
<b>Existing capabilities</b>			
Advanced clean energy technologies	New electrochemical electrode materials for solid state energy conversion/ models for network transformation.	Project on hold due to major staff changes.	Project closed because of staff changes.
	Nanostructure sorbents and filter materials for syngas processing: (a) Carbon capture	Confirmation of New Zealand-sourced materials performance for new sorbent recycling process.	Significant technical progress resulting in process patent. Further investment being sought.
	(b) Processing of ethanol in fuel cells.	Continue basic catalyst development through PhD project and scope design for membrane-based fuel processor applications, including evaluation of low-pressure nanoscale membranes.	Promising hydrogen yields obtained and advances in materials knowledge.
Supercritical fluid extraction	New supercritical fluid applications.	Develop technologies to produce engineered particles using supercritical fluids and to produce biofuels in supercritical water.	Collaboration with University of Auckland to use supercritical extraction to create bioactive nanoparticles and liposomes. Development of apparatus for producing biofuels using supercritical water, and first demonstration of the production of hydrogen.
	Bioactives from primary products.	Develop plant-based wound healing and nutraceutical products and anti-inflammatory products from meat.	New wound-healing product using grapefruit skin extract developed, wound closure demonstrated on a diabetic patient. New joint care products being developed from meat waste. Bioactives with potential for new nutraceuticals being extracted from native fungi.

Capability	Areas of activity	2007/08 forecast	2007/08 achievement
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Existing capabilities (continued)

	Advanced bioprocessing technologies.	Establish photobioreactor cultivation of microalgae and advanced enzymatic synthesis of xenobiotics and sialic acid conjugates.	<p>Greatly improved yields and productivity for glucuronidation of pharmaceutical compounds leading to new commercial projects.</p> <p>Identification of microalgae producing polyunsaturated fatty acids.</p> <p>New methodology developed for quantifying sialic acid and derivatives.</p>
Carbohydrate chemistry	Synthesis of new therapeutic glycolipids.	This programme of work will be continued in 07/08 due to the very positive results obtained. The area will be the basis for elements of a FRST NERF application for funding in 08/09. It will maintain the Malaghan/AgResearch relationship and introduce a new collaboration with the LIAI (La Jolla Institute of Allergy and Immunology, USA). It will support the start of formal pre-clinical studies with a new class of vaccine adjuvants.	A patent was exemplified through the synthesis and biological evaluation of 12 glycolipid adjuvants, the most promising now being in a development phase project in partnership with VicLink, Grow Wellington and the Malaghan Institute of Medical Research, as an adjuvant for a cancer vaccine. Different glycolipids synthesised at IRL are being evaluated by leading US immunology labs (LIAI and University of Wisconsin) and a manuscript has been submitted for publication.
	Analytical method development for bioactive glycoconjugates.	Work on the isolation and characterisation of heparin sulphate oligosaccharides was moved to support commercial project funding. Continued investment in this area will be focused on development of expertise in the wider applications of a new capital investment in state-of-the-art Dionex HPAEC (anion exchange chromatography).	New analytical capabilities (Dionex HPAEC, Agilent HPLC and Coronal Discharge detector ) have all been set up and used to develop protocols for analysis of complex carbohydrates.

Capability	Areas of activity	2007/08 forecast	2007/08 achievement
<b>Existing capabilities (continued)</b>			
	Development of young scientists through research on novel drug discovery.	Three projects: novel glycolipid HIV therapeutics; anti-cancer heparin sulfate mimetics and glycosylated aza-sugars; and therapeutic oligosaccharides.	An IRL scientist spent four months with an Austrian collaborator synthesising novel inhibitors as potential therapeutics. A route to a novel class of dendrimers with therapeutic potential has been found. The utility of microwave promoted chemistry was such that a Microwave Reactor system has been purchased and brought into operation.
<b>Smart materials design and performance</b>	Computational modelling and testing of composite structures. Acoustic control systems.	Secure RFI FRST projects.  Secure industry co-funding.  Step-change in materials durability assessment.	Two new foundation projects secured – Acoustically Efficient Buildings and Advanced Aerospace Composites (sub-contract from Auckland University).  Co-funding secured for Acoustically Efficient Buildings project.  Initial imaging algorithms developed to assess “super resolution” capability for non-destructive testing applications.
<b>New and emerging capabilities</b>			
<b>Materials science for hydrogen</b>	Understanding process chemistry for hydrogen separation.  New nanostructured materials with high hydrogen storage capacity.	Secure FRST funding.  Develop new amino-borane-based hydrogen storage materials exceeding US DoE criteria.	FRST funding secured and further funding through sub-contract and industry partnership.  Strong scientific programmes, including control of membrane fabrication characteristics and new chemical and electrochemical processes for using them.  A number of academic papers and presentations at international conferences arose out of this work in partnership with US laboratories. Pursuing commercial opportunity for hydrogen storage.

Capability	Areas of activity	2007/08 forecast	2007/08 achievement
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**New and emerging capabilities (continued)**

HTS magnet, coil and power systems equipment design	<p>Identifying risks in full design and fabrication.</p> <p>Spin tests on HTS coils.</p> <p>Two graduate student HTS programmes (ME and PhD) at University of Canterbury.</p>	<p>Complete scoping study of high-field magnet.</p> <p>Test HTS coil.</p> <p>Timing dependent on test facility availability.</p> <p>Research programme and contracts in place.</p>	<p>Completed and report submitted concluding that at today's wire prices a high-field magnet is unlikely to attract commercial interest unless there are special circumstances. Coil test undertaken.</p> <p>Spin test to be undertaken in late August at US Air Force facility.</p> <p>Contract finalised on support of programmes. Work plan developed and in place.</p>
Microfluidics	Fluid flow modelling microfluidic device, construction, device design.	<p>Develop capability that underpins programmable microfluidics.</p> <p>Contribute to larger Nanotechnology Centre of Excellence in New Zealand.</p>	<p>Increase in funding through successful FRST fluidics re-bid and new staff member hired.</p> <p>Progress made on application for a National Microfabrication through Government's infrastructure advisory group, RIAG.</p> <p>Success in design and construction of Polydimethylsiloxane (PDMS).</p>
Advanced organic materials for photonics	<p>Higher-performance photonic materials.</p> <p>Validate theoretical model.</p>	<p>Work on all-optical and electro-optical devices for ICT.</p> <p>Underpinning research in THz imaging and sensing, including setting up a THz system and research into new materials for strain and chemical sensing.</p>	<p>Full NERF programme has been submitted and end-user reference group established.</p> <p>Measured r33 values of up to 100pm/V at 1310nm.</p>
Medical applications for imaging and detecting technology	Optics and ultrasound imaging of surface and subsurface tissue.	<p>Development of device that presents best science and commercial opportunity.</p> <p>Seek FRST NERF investment for project.</p>	<p>New NERF FRST funding secured for four years to develop optical and ultrasound-based devices for disease screening using skin as a proxy. Provisional patents filed (New Zealand and US) for optic-based technology with possible commercial interest in device.</p> <p>RFI funding also secured for high-frequency ultrasound imaging for a medical application.</p>

Capability	Areas of activity	2007/08 forecast	2007/08 achievement
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New and emerging capabilities (continued)

<p>Assistive medical science</p>	<p>Human interface issues in use of assistive devices and physical therapy and rehabilitation systems.</p>	<p>Biomechanical modelling: develop knowledge of suitable evaluation of modelling platforms.</p> <p>Build relationships with key universities working in this area.</p> <p>Upper limb exerciser: Processes and devices trialled with patients and research clinicians and further as a result.</p> <p>Establish links with key collaborators at Auckland, Canterbury, Otago and Pittsburgh universities.</p> <p>Therapeutic vibration: Enhance ongoing relationship with Massey and Otago universities with view to submitting HRC research proposal.</p>	<p>AnyBody biomechanical modelling system evaluated.</p> <p>Relationships developed with researchers involved in upper limb robotic stroke therapy in UK, and at Canterbury and Auckland universities.</p> <p>Developed to clinical pilot trial stage a novel bilateral exercise system using virtual reality as motivator.</p> <p>Project involved collaboration with Otago University and with a neurologist at Auckland University.</p> <p>Two proposals unsuccessful but one scored highly and being resubmitted.</p>
<p>Creative and strategic research initiatives in Information and Communications Technologies</p>	<p>Computer game content.</p> <p>IP cores.</p>	<p>Extend 3D scanning capability to computer game content creation and develop prototype game in conjunction with Media Design School.</p> <p>Develop underpinning visualisation and data handling capability particular to this sector.</p> <p>Establish foundation for development of FPGA capability within IRL.</p> <p>Formalise relationship with industry partner and initiate WiMax baseband processor design as proof of concept.</p>	<p>Media Design School relationship developed, leading to new Research Partnership Scheme being introduced. This will support training of students in application of new technologies and first student will be working with 3D scanning team.</p> <p>FPGA development environment established and a project leader recruited to manage the process and provide technical leadership. Relationship with industry partner formalised.</p>

Capability	Areas of activity	2007/08 forecast	2007/08 achievement
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**New and emerging capabilities (continued)**

ICT strategy.	Identify parameters of IRL ICT strategy project and employ expert in this area to progress strategy development.	ICT research strategy paper developed for IRL. This is now being extended to include the wider New Zealand electronics sector.
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**Over the horizon – discovery and creative insight activity**

<p>Redefining the SI (International Systems) Quantum Limits</p>	<p>Fundamental science on fixed fundamental constants as basis for international measurement standards.</p>	<p>Pursue two science paths, both aimed at overall goal of an improved SI based on fixed values of some fundamental constants of physics.</p> <p>Engage with international researchers.</p>	<p>Two new design concepts devised for Watt balance approach to linking the kilogram to Planck Constant.</p> <p>Method developed for calculating the rates for the macroscopic quantum tunnelling processes through quantum dots – important to redefining the ampere in terms of the electron charge.</p> <p>Researchers have given presentations to a range of conferences and have been invited to talk to peer groups in the field.</p> <p>Collaboration with Japanese researchers has led to exchange visits.</p>
<p>New materials for spintronics</p>	<p>Control of electron spin.</p>	<p>Research and development of new magnetic sensors in a programme that involves collaboration with Victoria and Canterbury Universities and international collaborations with universities in Germany and France.</p>	<p>Research undertaken with national and international universities. New materials identified and measurement of their physical properties commenced. FRST bid developed and successfully gained funding.</p>
<p>Mathematical modelling</p>	<p>Density functional theory.</p> <p>Advanced techniques in mathematical modelling.</p>	<p>Work programme to be guided by MoRST Roadmap on Nanotechnology.</p> <p>IRL research skills to be applied widely around New Zealand and emphasis continued on maintaining and developing international linkages.</p>	<p>IRL access to Blue Gene Supercomputer at Canterbury University has been catalyst for much new research that has caught international attention.</p> <p>An excellent collaboration is developing with researcher in the French city of Lyon in nanofluidics and the theory of slip.</p>

## + IRL is environmentally responsible

IRL has embraced the Government's prioritisation of environmental sustainability as an important goal for Crown agencies. Sustainability is central to IRL's operations and is directly reflected in some of our research work programmes such as distributed energy systems and wave energy generation.

We aim to be environmentally sustainable in all aspects of our research and consultancy work as well as in the commercialisation of our technologies.

Our sustainability programme includes:

- ensuring we are making the most effective use of energy through building insulation, voltage smoothing, load shedding and automatic peak load minimisation, and adhering to the principles of EECA's Energywise Company scheme
- making the most effective use of water through appropriate technology to avoid unnecessary usage, recycling some water, and putting in place up-to-date contingency plans to prevent any accidental discharges of pollutants
- ensuring care is taken in the use and disposal of waste substances through the segregated storage of dangerous goods, the containment of biological materials, and the effective treatment and testing of liquid chemical waste before it is released through approved trade waste outlets
- recycling solvents used in laboratories, together with paper and cardboard and glass and plastics
- minimising the toxic content of emissions into the air
- working proactively with our suppliers to encourage them to follow sustainable practices in the goods and services we purchase
- developing and implementing a site planting programme, including plantings of threatened species.

Staff have input into sustainability policy and practice through Health, Safety and Environment Committees at all three IRL sites. They are also encouraged to reduce their environmental impacts through sustainable work practices.

By next year, we will have developed sustainability performance measures and will be in a position to report on our sustainability performance.

### THINK GLOBALLY, ACT LOCALLY

Monthly Climate Change meetings are a staff initiative to discuss how individuals at IRL can help offset some of the effects of climate change and other environmental issues.

Topics include recycling of plastics and glass, support for the national Bike Wise Week and initiatives to save energy.



# + Financial Statements

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## Financial trends analysis

Group	FY2008 \$000	FY2008 \$000 SCI Budget*	FY2007 \$000	FY2006 \$000	FY2005 \$000	FY2004 \$000
Operating revenue	57,133	52,424	55,018	73,812	60,165	57,716
Interest received	39	280	48	106	23	55
Gain on disposal of property, plant and equipment	8	-	1,060	9,494	-	332
Revenue from trading	57,086	50,701	53,910	64,212	60,142	57,329
Depreciation	4,441	3,573	5,399	6,517	6,448	6,524
Interest expense	660	1,165	1,035	1,913	1,465	1,359
Non-operating items	143	-	1,010	7,712	931	483
Earnings/(deficit) before interest, tax and non-operating items*	1,309	(793)	(2,073)	532	(6,068)	(3,753)
Net surplus/(deficit) before tax	543	(1,678)	(3,010)	507	(8,441)	(5,208)
Net surplus/(deficit) after tax	543	(1,678)	(5,710)	(1,634)	(5,371)	(4,037)

	FY2008 \$000	FY2008 \$000 SCI Budget*	FY2007 \$000	FY2006 \$000	FY2005 \$000	FY2004 \$000
Funds employed						
Equity	28,583	27,078	19,760	25,173	26,450	26,806
Borrowings	9	10,913	11,873	12,665	23,064	21,482
Other term liabilities	568	616	616	881	1,003	1,053
	<b>29,160</b>	<b>38,607</b>	<b>31,746</b>	<b>38,159</b>	<b>50,517</b>	<b>49,341</b>
Use of funds						
Working capital	(4,660)	(3,975)	(3,269)	(1,629)	(1,567)	(437)
Non-current assets	33,820	42,582	35,518	40,348	52,084	49,778
	<b>29,160</b>	<b>38,607</b>	<b>31,746</b>	<b>38,159</b>	<b>50,517</b>	<b>49,341</b>
Gearing %	5.13%	28.73%	39.25%	35.36%	46.76%	44.70%

\*Non-operating items includes employee termination costs, disposal and impairment of property, plant and equipment and write-off of goodwill.

## Financial indicators

	FY2008 Actual	FY2008 SCI Budget*	FY2008 Budget	FY2007 Actual	FY2006 Actual
<b>Earnings performance</b>					
Revenue from trading (\$000s)	57,086	50,701	60,986	53,910	64,212
Earnings/(deficit) before interest, tax and non-operating items (EBIT) (\$000s) *	1,309	(793)	(1,746)	(2,073)	532
EBIT* margin (%)	3.29%	-1.56%	-2.86%	-3.74%	0.83%
Net surplus before tax (\$000s)	543	(1,678)	(676)	(3,010)	507
Net surplus after tax (\$000s)	543	(1,678)	(676)	(5,710)	(1,634)
EBIT* to average funds employed (%)	4.30%	-3.42%	-5.50%	-5.78%	1.21%
Return (EBIT*) on average equity (\$000s)	5.47%	-7.24%	-9.07%	-9.19%	2.08%
Return (EBIT*) on assets (\$000s)	3.36%	-1.51%	-4.50%	-3.95%	0.97%
<b>Financial Position</b>					
Current ratio	0.52	0.72	0.66	0.61	0.87
Quick ratio	0.51	0.73	0.56	0.63	0.94
Average equity ratio	0.61	0.50	0.48	0.43	0.47
Time interest covered	2.11	(0.68)	-1.67	-1.95	0.28
Gearing (debt component)	0.05	0.30	0.37	0.39	0.35
Crown nominal investment (\$000s)	28,583	27,079	18,832	19,760	25,173
<b>Other statistics</b>					
Revenue from trading per FTE (\$000s)	185.95	163.00	198.65	176.75	174.02
<b>Number of staff (FTEs)</b>					
– research teams	216	231	216	216	269
– research support	31	31	31	23	27
– general support and management	60	60	60	66	73

\* 1. The SCI targets are reported separately to the final budgeted figures for IRL. These figures were completed and submitted prior to the budget for the financial year being finalised. The face of the financial statements use the final budgeted figures not the SCI targets.

2. The SCI figures for revenues were prepared for the 2008 year net of external contract research costs with other similar entities. The reporting format used was in line with previous practice. The budget figures are prepared with all revenue figures shown as gross for external financial reporting purposes.

3. IRL does not intend to pay a dividend to the Crown for the year ended 30 June 2008.

## Key performance indicators

### Strategy One:

Deliver research solutions through more effective engagement with New Zealand industry

Measure	Method	Target	Outcome
High-potential companies identified and engagement strategies developed	Identification completed, operational plans agreed for 07/08 activities	2	Completed
New patents granted in New Zealand	Number completed	8	4
New patents granted overseas	Number completed	5	7
Licensing arrangements entered into	Number completed	5	2
Joint ventures or formal associations	Number completed	3	2
Commissioned reports to users	Number completed	Base to be established post-contracting with FRST	56
Start-up companies (spin-off or spin-out)	Number completed	2	0

### Strategy Two:

Grow our research, development and application excellence

Measure	Method	Target	Outcome
Number of peer reviewed articles and publications	Number completed	120	49
Submitted conference papers	Number completed	90	89
Books/book chapter	Number completed	6	11
Invited presentations on technical information and R&D to customers and contracted clients, community forums, parliamentary talks	Number completed	6	111
Visiting scientists (self-funded)	Visits over 3 months	3	7
Establish project selection and management processes	Project management system revised and adopted	Apr-08	Stage one completed
Align Science KPI with Crown reporting requirements	Additional KPIs identified for 08/09	Apr-08	Completed

**Strategy Three:**

Build our research capacity

Measure	Method	Target	Outcome
Establish long-term capital equipment investment schedule	Plan endorsed by Board	Feb-08	A 3-year capital equipment plan currently in place is being extended to 10 years to include all capital requirements
Establish long-term site/location development plans	Plan endorsed by Board	May-08	A space planning committee is operational and dealing with current space needs; more work is required to define long term site and space requirements
Review utilities costs	Introduce activities to contain costs	Dec-07	Procurement practices have been put in place to reduce costs across IRL; however, aging and expensive site infrastructures mean that reducing utilities costs without capital expenditure is difficult
Review inventory management	New inventory management and procurement systems introduced	Mar-08	Existing management systems have been enhanced in line with ongoing procurement enhancements

**Strategy Four:**

Achieve organisational sustainability through revenue diversification and operational effectiveness

Measure	Method	Target	Outcome
Revenue	Revenue/budget	Budget	Revenue has not met expectations, particularly in commercial revenue areas. Enhanced business development resource and capability are expected to improve delivery on this in 08/09
EBIT	EBIT/budget	Budget	EBIT is well ahead of budget due to success of procurement and cost control strategies. This will be difficult to replicate in financial year 08/09
Cash flow	Operating cash flow	Budget	Operating cash flow has improved with a positive cash flow from operations
Staff/HR development	Health and safety compliance	100%	Audits completed and IRL retained its secondary rating with ACC

Staff satisfaction	Annual staff survey	5-10% improvement	Improvement achieved
Capital Investment	Equal to budget	Budget	On track
Complete analysis of existing revenue sources	Opportunities and deficiencies identified, new revenue model	Mar-08	Analysis has been completed of customers over the previous 3 years and with the customer satisfaction survey this will identify existing and new customer opportunities
Involvement in COREs, R&D consortia, etc	Number completed	2	4
R&D joint venture	Number completed	2	7
Successful funding bids	% of bids awarded	>50% of initial bids	Of the total number of bids initially submitted to FRST in the contestable investment round, IRL was successful in having 67% proceed to full consideration, and of these 56% were funded

#### Strategy Five:

Ensure that our systems, processes and execution deliver our mission

Measure	Method	Target	Outcome
Introduced comprehensive performance management	Balanced scorecard operational	Feb-08	Fully operational
Review standard operating procedures and management information systems	Ongoing needs established and investment/development schedule agreed	Progressive through year	Systems reviewed with existing systems being utilised fully in the short term over the next 2 years
Establish operational planning mechanisms	High-level operational plan in existence	Progressive through year	Detailed operational plans in existence
Return IRL to the standing planning cycles	Strategic Plan, SCI and budget finalised before 30 June 2008	30-Jun-08	Completed

# Board of Directors

## Roles and responsibilities

Under the Crown Research Institute Act 1992, the operating principles of a Crown Research Institute are to:

- undertake research for the benefit of New Zealand
- pursue excellence in all their activities
- comply with applicable ethical standards
- promote and facilitate the application of the results of research and technological developments
- be a good employer
- exhibit a sense of social responsibility by having regard to the interests of the community.

## Role of the Board of Directors

The Board has a responsibility to protect and enhance the value of the Group in the interests of the Group and the Crown as shareholder. In terms of the Crown Research Institute Act 1992 and the Crown Entities Act 2004 this includes responsibility for:

- the preparation of and compliance with the Group's Statement of Corporate Intent
- the overall management of the Group through the appointment of the Chief Executive and the monitoring of his performance.

From a strategic and governance perspective, the Board is responsible for:

- setting the strategic direction and policy
- appointing and delegating responsibility for Industrial Research's management to the CEO
- monitoring the Chief Executive's performance against established goals
- ensuring compliance with the law, accountability documents and government expectations
- ensuring the correct financial structure is in place.

## Composition of the Board

The Board establishment is between two and nine (but is normally six) non-executive directors who meet approximately 11 times per year and as required for strategic planning purposes. The directors are appointed by the shareholding Ministers in accordance with section 7 of the Crown Research Institute Act 1992. The normal term of

appointment is three years with reappointment at the discretion of the shareholding Ministers. The Board reviews its performance and the performance of each director annually. The formal evaluations are submitted to shareholding Ministers each year.

## Composition of subsidiaries

The following persons held the office of director representing the interests of Industrial Research Limited on various subsidiary and associate company boards of directors. Except where disclosed elsewhere, no director of a subsidiary or associate company received any directors' fees or other benefits as a director.

### **Bio-Sol Limited**

R Furneaux

### **GlycoSyn Technologies Limited**

Non-trading

S G Coffey

### **Industrial Research PTY Limited**

S G Coffey, J Maleki

### **Innovation Finance Limited**

A Coupe, J Cunningham, A Mazzoleni (Chair), C Stobo, J Walley

(amalgamated into IRL Group 14 April 2008)

### **Measurement Standards Laboratory of NZ Limited**

S G Coffey

### **MTP-Matcor Pte Limited**

(Ceased trading while company is wound up)

### **Sonic Ray Technology Limited**

G McIrvine, P Weatherly

### **Superlink Developments Limited**

S G Coffey, J McDonald, B Rhoades (Chair)

## Composition of associates

### **HTS-110 Limited**

S G Coffey (from July 2008),

A Coupe, M Dossor (until November 2007),

N Jordan (from November 2007),

J Maguire, A Mazzoleni (until September 2007),

I M Parton (Chair)

### **General Cable Superconductors Limited**

Began trading 19 December 2007

C Birkett, R Buckley, S G Coffey, G Diack (Chair),

A Gilmore, R MacDonald (from 30 May 2008)

## Register of interests

In conjunction with each Board meeting, the directors and Chief Executive have declared the following interests:

**M Ahie** – Director, Bio Commerce Centre Limited; Director, Manawatu Investment Group Limited; Chief Executive, Shirlaws New Zealand Limited; Director, Shirlaws Coaching Limited and Shirlaws Pty Limited; Director, Clearwater Limited; Director, Jama Property Limited; Trustee, Ripotautahi Whanau Trust; Trustee, The Jama Trust.

**S G Coffey** – Director, Quest Reliability LLC; Director, MacDiarmid Institute for Advanced Materials and Nanotechnology; Director, Science New Zealand Limited.

**D Henry** – Chair, Bullet Freight Systems Limited; Chair, Androgenix Limited; Director, Burns & Ferrall Limited; Director, Keratec Limited; Director, Klein Medical Limited; Director, Henry Manufacturing Limited; Director, Henry and Associates Limited; Director, Maven Wines Limited; Director, Trust House Limited; Director, Wool Equities Limited.

**A Mazzoleni** – Director, Maz Group Limited; Associate Member, Commerce Commission.

**I M Parton** – Deputy Chair, Watercare Services Limited; Chair, HTS-110 Limited; Chair, VT Fitzroy Limited; Member, Civil and Environmental Engineering Department Advisory Board; Trustee, University of Auckland Foundation; Trustee, AUEA Charitable Trust.

**B Rhoades** – Principal, Brian L Rhoades and Associates Limited; Chair, Council of Nelson-Marlborough Institute of Technology; Chair, Nelson Electricity; Commissioner, Tertiary Education Commission; Professional Development Contractor, Council Member and Nelson Branch Chairman, Institute of Directors in New Zealand Inc; Director, Superlink Developments Limited.

**M Simmons** – Director, Biocatalyst Limited; Director, Maurice Wilkins Centre for BioDiscovery; Member, NZBio Auckland Management Committee; Chief Executive, Cure Kids Venture Management Limited.

**C Stobo** – Deputy Chair, Appello Services Limited; Chair, AMP Multiplex Management Limited; Chair, OGC Consulting Group Limited; Director, Saturn Portfolio Management Limited and Saturn Investment New Zealand Limited; Chair, Elevation Capital Management Limited; Chair, Southwest Trustee Limited; Director, AH Stobo Limited and Stobo Group Limited; Director, Innovation Finance Limited; Trustee, Stobo Family Trust.

## Information used by directors

No member of the Board of Industrial Research Limited, or any subsidiary, issued a notice requesting to use information received in their capacity as directors which would not otherwise have been available to them.

## Indemnification and insurance of officers and directors

The Parent indemnifies all directors named in this report, and current and former officers of the Group against all liabilities (other than that to the Parent or member of the Group) which arise out of the performance of their normal duties as director or executive officer, unless the liability relates to conduct involving lack of good faith. To manage this risk, the Group has indemnity insurance.

## Insurance cover on liability or costs of any member

During the year, the directors' and officers' liability insurance was renewed to cover risks normally covered by such policies arising out of acts or omissions of directors and employees in their capacity as such. Insurance is not provided for dishonest, fraudulent, malicious or wilful acts or omissions. The insurance cover is provided by QBE Insurance (International). The cost of the cover for the year to 30 November 2008 is \$23,903.

## Board attendances for 2007/08

	IRL Board	Audit & Risk Committee	Remuneration Committee
M Ahie	9	n/a	1
D Henry	10	3	n/a
A Mazzoleni	9	n/a	n/a
I M Parton	11	3	1
B Rhoades, Chair	11	3	1
C Stobo, Deputy Chair	11	3	n/a
M Simmons	10	n/a	n/a

## Directors' remuneration table

IRL Board of Directors	IRL Board Fees (\$)	Sub-committee Fees (\$)	Subsidiary Fees (\$)	IRL Board Fees (\$)	Sub-committee Fees (\$)	Subsidiary Fees (\$)
FY2008			FY2007			
M Ahie	29,000	-	-	-	-	-
D Henry	29,000	-	-	-	-	-
A Mazzoleni	27,350	-	19,667	22,500	17,850	24,000
R Nottage	-	-	-	22,500	1,400	-
I M Parton	29,000	-	13,125	22,500	4,700	38,750
B Rhoades	58,000	-	-	45,000	6,100	-
M Simmons	21,750	-	-	-	-	-
C Stobo	37,075	-	8,333	28,125	3,300	10,000
<b>Total</b>	<b>231,175</b>	<b>-</b>	<b>41,125</b>	<b>140,625</b>	<b>33,350</b>	<b>72,750</b>
External directors of subsidiaries						
A Coupe			20,333			14,000
J Cunningham			8,333			10,000
J L Walley			8,333			10,000
<b>Total</b>	<b>231,175</b>	<b>-</b>	<b>78,124</b>	<b>140,625</b>	<b>33,350</b>	<b>106,750</b>

## Employees' remuneration

Industrial Research Limited's employment philosophy is to recruit and retain high-calibre staff. The number of employees within the Group receiving remuneration and benefits above \$100,000 is included in the following table. During the year, compensation payments were made to three employees totalling \$143,045 (2007: 25 employees totalling \$1,596,078\*)

	FY2008	FY2007
\$440,000 - \$449,999	-	1
\$430,000 - \$439,999	-	1
\$410,000 - \$419,999	1	-
\$370,000 - \$379,999	-	1
\$320,000 - \$329,999	-	1
\$300,000 - \$309,999	-	1
\$260,000 - \$269,999	-	-
\$240,000 - \$249,999	-	-
\$230,000 - \$239,999	-	-
\$210,000 - \$219,999	-	3
\$200,000 - \$209,999	1	-
\$190,000 - \$199,999	1	-
\$180,000 - \$189,999	-	2
\$170,000 - \$179,999	-	-
\$160,000 - \$169,999	2	1
\$150,000 - \$159,999	6	4
\$140,000 - \$149,999	4	2
\$130,000 - \$139,999	4	4
\$120,000 - \$129,999	5	5
\$110,000 - \$119,999	5	13
\$100,000 - \$109,999	6	8

\* Includes compensation payments made to 19 science staff and six non-science employees

# Corporate Governance

## Key policies

The Board is responsible for setting and determining key policies. Approved policies cover such areas as delegations of authority, risk management, treasury, regulatory compliance and insurance. The delegations policy provides authority and responsibilities of staff and prescribes the process of financial delegation. The levels of financial delegation are reviewed periodically. Compliance with the many legal requirements under which the business operates is of utmost importance to the Board. Industrial Research takes compliance with these statutes seriously and there is a constant process of initiatives to improve the level of compliance.

## Auditors

The Board of Directors ratified the Auditor-General's appointment of PricewaterhouseCoopers as the auditors for the Group. The Board has adopted a policy to maintain the independence of the external auditors.

## Board committees

The Board has two sub-committees. The membership and terms of reference for the committees are reviewed regularly by the Board.

### Audit and Risk Committee Membership

C Stobo (Chair)                      I M Parton                      B Rhoades                      D Henry

The function of the Audit and Risk Committee is to assist the Board in carrying out its responsibilities regarding the following aspects:

- management's accounting practices
- risk management
- policies and controls relative to the company's financial results
- review and make appropriate enquiry into the audit of the company's accounts by the external auditors
- ensure compliance with statutory legislation
- investments in new activities, business entities or joint ventures
- divestment of existing activities or business entities
- capital expenditure valuations
- monitoring the investment portfolio of the Parent to improve the efficiency of the overall process at Board level.

This committee normally meets as required, but no less than four times a year. In 2007/08 three meetings were held.

### Remuneration Committee Membership

B Rhoades (Chair)                      I M Parton                      M Ahie

This committee assists the Board in determining remuneration for the Chief Executive Officer. It also reviews remuneration and performance reviews of the executives who report directly to the CEO.

In addition, it is responsible for oversight of the IRL Remuneration Strategy and its implementation. The Remuneration committee meets only as required and during the 2007/08 year it met once.

# Report of the Auditor-General

To the readers of  
INDUSTRIAL RESEARCH LIMITED'S FINANCIAL STATEMENTS  
For the year ended 30 June 2008

The Auditor-General is the auditor of Industrial Research Limited (the company). The Auditor-General has appointed me, Fred Hutchings, using the staff and resources of PricewaterhouseCoopers, to carry out the audit of the financial statements of the company, on his behalf, for the year ended 30 June 2008.

## Unqualified Opinion

In our opinion:

- The financial statements of the company and group on pages 60 to 97:
  - comply with generally accepted accounting practice in New Zealand; and
  - comply with International Financial Reporting Standards; and
    - the company's financial position as at 30 June 2008; and
    - the results of operations and cash flows for the year ended on that date.
- Based on our examination the company and group kept proper accounting records.

The audit was completed on 12 September 2008, and is the date at which our opinion is expressed.

The basis of our opinion is explained below. In addition, we outline the responsibilities of the Board of Directors and the Auditor, and explain our independence.

## Basis of Opinion

We carried out the audit in accordance with the Auditor-General's Auditing Standards, which incorporate the New Zealand Auditing Standards.

We planned and performed the audit to obtain all the information and explanations we considered necessary in order to obtain reasonable assurance that the financial statements did not have material misstatements, whether caused by fraud or error.

Material misstatements are differences or omissions of amounts and disclosures that would affect a reader's overall understanding of the financial statements. If we had found material misstatements that were not corrected, we would have referred to them in our opinion.

The audit involved performing procedures to test the information presented in the financial statements. We assessed the results of those procedures in forming our opinion.

Audit procedures generally include:

- determining whether significant financial and management controls are working and can be relied on to produce complete and accurate data;
- verifying samples of transactions and account balances;
- performing analyses to identify anomalies in the reported data;
- reviewing significant estimates and judgements made by the Board of Directors;
- confirming year-end balances;
- determining whether accounting policies are appropriate and consistently applied; and
- determining whether all financial statement disclosures are adequate.

We did not examine every transaction, nor do we guarantee complete accuracy of the financial statements.

We evaluated the overall adequacy of the presentation of information in the financial statements. We obtained all the information and explanations we required to support our opinion above.

### **Responsibilities of the Board of Directors and the Auditor**

The Board of Directors is responsible for preparing financial statements in accordance with generally accepted accounting practice in New Zealand. Those financial statements must give a true and fair view of the financial position of the company and group as at 30 June 2008. They must also give a true and fair view of the results of operations and cash flows for the year ended on that date. The Board of Directors' responsibilities arise from the Crown Research Institutes Act 1992, the Public Finance Act 1989 and the Financial Reporting Act 1993.

We are responsible for expressing an independent opinion on the financial statements and reporting that opinion to you. This responsibility arises from section 15 of the Public Audit Act 2001, section 21(1) of the Crown Research Institutes Act 1992 and the Public Finance Act 1989.

### **Independence**

When carrying out the audit we followed the independence requirements of the Auditor-General, which incorporate the independence requirements of the Institute of Chartered Accountants of New Zealand.

We have no relationship with or interests in the Company other than in our capacity as auditors.

### **Matters Relating to the Electronic Presentation of the Audited Financial Statements**

This audit report relates to the financial statements of Industrial Research Limited and group for the year ended 30 June 2008 included on Industrial Research Limited's web-site. The company's board is responsible for the maintenance and integrity of the Industrial Research Limited web site. We have not been engaged to report on the integrity of the Industrial Research Limited web site. We accept no responsibility for any changes that may have occurred to the financial statements since they were initially presented on the web site. The audit report refers only to the financial statements named above. It does not provide an opinion on any other information which may have been hyperlinked to/from these financial statements. If readers of this report are concerned with the inherent risks arising from electronic data communication they should refer to the published hard copy of the audited financial statements and related audit report dated 12 September 2008 to confirm the information included in the audited financial statements presented on this web site. Legislation in New Zealand governing the preparation and dissemination of financial statements may differ from legislation in other jurisdictions.



Fred Hutchings

On behalf of the Auditor-General

Wellington, New Zealand



PricewaterhouseCoopers

# Income Statement

For the year ended 30 June 2008

	Notes	GROUP			PARENT	
		2008 ACTUAL	2008 BUDGET	2007 ACTUAL	2008 ACTUAL	2007 ACTUAL
		\$000	<i>Unaudited</i> \$000	\$000	\$000	\$000
Revenue – Crown	3	40,205	40,979	38,632	40,205	38,632
Revenue – Commercial	3	15,300	18,728	13,229	15,298	13,188
Total revenue		55,505	59,707	51,861	55,503	51,820
Other income	3	1,589	1,279	2,168	1,583	2,153
		57,094	60,986	54,029	57,086	53,973
Employee benefit costs	4	(26,677)	(28,094)	(26,478)	(26,677)	(26,392)
Science project and subcontract costs	4	(12,195)	(14,770)	(13,906)	(12,195)	(13,855)
Other expenses	4	(11,824)	(12,527)	(10,433)	(11,758)	(8,060)
Depreciation	10	(4,441)	(4,742)	(4,871)	(4,441)	(4,863)
Amortisation of intangible assets	11	(544)	(500)	(544)	(544)	(545)
Operating profit (loss)		1,413	353	(2,203)	1,471	258
Finance income		39	19	48	39	47
Finance costs		(660)	(1,048)	(1,036)	(1,303)	(1,035)
Share (loss) of associate		(249)	-	(313)	-	
Profit/(Loss) before income tax		543	(676)	(3,504)	207	(730)
Income tax expense	6	-	-	(2,700)	-	(2,700)
Profit/(loss) after income tax for the period from continuing operations		543	(676)	(6,204)	207	(3,430)
Surplus from discontinued operations after income tax	5	-	-	494	-	326
Profit attributable to members of the Parent		543	(676)	(5,710)	207	(3,104)

# Statement of Changes In Shareholder's Equity

For the year ended 30 June 2008

		GROUP			PARENT	
		2008 ACTUAL	2008 BUDGET	2007 ACTUAL	2008 ACTUAL	2007 ACTUAL
Notes		\$000	<i>Unaudited</i> \$000	\$000	\$000	\$000
Net surplus/(deficit) for the period, comprising						
Parent shareholders interest		543	(676)	(5,710)	207	(3,104)
Other recognised revenues and expenses						
Foreign currency translation reserve		8	-	(13)	-	-
<b>Total recognised income and expenses for the year</b>		<b>543</b>	<b>(676)</b>	<b>(5,723)</b>	<b>207</b>	<b>(3,104)</b>
Contribution from owners						
Share issue		8,280	280	310	8,280	310
Amalgamation of subsidiary		12	-	-	2,307	-
<b>Movement in equity for the period</b>		<b>8,823</b>	<b>(396)</b>	<b>(5,413)</b>	<b>10,794</b>	<b>(2,794)</b>
Equity at beginning of period as previously reported						
Prior period adjustment		10	570	-	570	586
Equity at beginning of period		19,760	19,228	24,587	21,010	23,804
<b>EQUITY AT END OF PERIOD</b>		<b>8</b>	<b>28,583</b>	<b>19,760</b>	<b>31,804</b>	<b>21,010</b>

# Balance Sheet

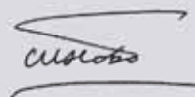
As at 30 June 2008

	Notes	GROUP			PARENT	
		2008 ACTUAL	2008 BUDGET	2007 ACTUAL	2008 ACTUAL	2007 ACTUAL
		\$000	<i>Unaudited</i> \$000	\$000	\$000	\$000
<b>EQUITY</b>						
Issued capital	8	32,840	24,840	24,560	32,840	24,560
Retained earnings	8	(4,257)	(6,008)	(4,800)	(1,036)	(3,550)
Other reserves	8	-	-	-	-	-
<b>TOTAL EQUITY</b>		<b>28,583</b>	<b>18,832</b>	<b>19,760</b>	<b>31,804</b>	<b>21,010</b>
<i>Represented by:</i>						
<b>CURRENT ASSETS</b>						
Cash and cash equivalents	7	98	746	738	78	697
Trade and other receivables	9	4,201	3,831	3,519	4,192	3,514
Inventories	20	806	870	870	806	870
<b>Total current assets</b>		<b>5,105</b>	<b>5,447</b>	<b>5,127</b>	<b>5,076</b>	<b>5,081</b>
<b>NON-CURRENT ASSETS</b>						
Other financial assets	14	478	471	254	478	254
Investment in associates using the equity method	13	563	1,806	812	3,807	-
Investment in subsidiaries	12	-	-	-	-	11,310
Accounts receivable	9	350	-	350	350	350
Deferred tax	19	-	-	-	-	-
Property, plant and equipment	10	31,670	30,379	33,293	31,670	33,293
Intangible assets	11	759	800	809	759	809
<b>Total non-current assets</b>		<b>33,820</b>	<b>33,456</b>	<b>35,518</b>	<b>37,064</b>	<b>46,016</b>
<b>TOTAL ASSETS</b>		<b>38,925</b>	<b>38,903</b>	<b>40,645</b>	<b>42,140</b>	<b>51,097</b>
<b>CURRENT LIABILITIES</b>						
Trade and other payables	21	4,676	4,454	3,774	4,670	3,769
Employee benefits	17	2,575	2,477	2,742	2,575	2,740
Interest-bearing loans and borrowings	16	1,456	-	569	1,456	569
Derivative financial instruments	24	7	-	-	7	-
Income in advance	18	1,051	1,311	1,311	1,051	1,311
<b>Total current liabilities</b>		<b>9,765</b>	<b>8,242</b>	<b>8,396</b>	<b>9,759</b>	<b>8,389</b>
<b>NON-CURRENT LIABILITIES</b>						
Employee benefits – provision for long service leave	17	568	756	616	568	616
Advances from subsidiaries	27	-	-	-	-	9,209
Interest-bearing loans and borrowings	16	9	11,073	11,873	9	11,873
<b>Total non-current liabilities</b>		<b>577</b>	<b>11,829</b>	<b>12,489</b>	<b>577</b>	<b>21,698</b>
<b>TOTAL LIABILITIES</b>		<b>10,342</b>	<b>20,071</b>	<b>20,885</b>	<b>10,336</b>	<b>30,087</b>
<b>NET ASSETS</b>		<b>28,583</b>	<b>18,832</b>	<b>19,760</b>	<b>31,804</b>	<b>21,010</b>

The Board of Directors of Industrial Research Limited authorised these financial statements for issue on 5 September 2008.



Brian Rhoades  
Chairman



Craig Stobo  
Deputy Chairman

# Cash Flow Statement

For the year ended 30 June 2008

	GROUP			PARENT	
	2008 ACTUAL	2008 BUDGET	2007 ACTUAL	2008 ACTUAL	2007 ACTUAL
	Notes \$000	Unaudited \$000	\$000	\$000	\$000
<b>CASH FLOWS FROM OPERATING ACTIVITIES</b>					
<i>Cash was provided from:</i>					
Receipts from Crown	40,205	40,979	38,758	40,205	38,758
Receipts from commercial customers	15,669	19,536	15,786	15,665	15,686
Interest received	39	19	47	39	47
Intellectual property	378	418	1,495	376	1,490
	56,291	60,952	56,086	56,285	55,981
<i>Cash was applied to:</i>					
Payments to suppliers	(23,393)	(28,088)	(28,042)	(23,325)	(27,874)
Payments to employees	(26,876)	(27,153)	(27,422)	(26,875)	(27,237)
Interest paid	(660)	(1,048)	(1,036)	(660)	(1,035)
	(50,929)	(56,289)	(56,500)	(50,860)	(56,146)
Net cash flows from operating activities	22	5,362	(414)	5,425	(165)
<b>CASH FLOWS FROM INVESTING ACTIVITIES</b>					
<i>Cash was provided from:</i>					
Sale of property, plant and equipment	8	-	1,118	8	1,114
Proceeds from sale of subsidiary	-	-	1,080	-	1,133
	8	-	2,198	8	2,247
<i>Cash was applied to:</i>					
Purchase of property, plant and equipment	(3,313)	(2,738)	(2,909)	(3,313)	(2,891)
Advances of loans to subsidiaries	-	-	-	-	(702)
Purchase of intangible assets	-	(150)	-	-	-
Purchase of long-term investments	-	-	(497)	-	-
	(3,313)	(2,888)	(3,406)	(3,313)	(3,593)
Net cash flows from investing activities	(3,305)	(2,888)	(1,208)	(3,305)	(1,346)
<b>CASH FLOWS FROM FINANCING ACTIVITIES</b>					
<i>Cash was provided from:</i>					
Term borrowings	-	-	-	-	-
Issue of ordinary shares	8,280	280	310	8,280	310
	8,280	280	310	8,280	310
<i>Cash was applied to:</i>					
Repayment of term debt	(10,447)	(1,118)	(250)	(10,447)	(250)
Finance lease principal payments	(530)	(251)	-	(530)	-
Loan to subsidiary/associate	-	(678)	-	(42)	-
	(10,977)	(2,047)	(250)	(11,019)	(250)
Net cash flows from financing activities	(2,697)	(1,767)	60	(2,739)	60

## Cash Flow Statement (continued)

For the year ended 30 June 2008

	GROUP			PARENT	
	2008 ACTUAL	2008 BUDGET	2007 ACTUAL	2008 ACTUAL	2007 ACTUAL
Notes	\$000	<i>Unaudited</i> \$000	\$000	\$000	\$000
Net increase/(decrease) in cash, cash equivalents and bank overdrafts	(640)	8	(1,562)	(619)	(1,451)
Cash, cash equivalents and bank overdrafts at beginning of year	738	738	2,300	697	2,148
<b>CASH, CASH EQUIVALENTS AT END OF YEAR</b>	<b>98</b>	<b>746</b>	<b>738</b>	<b>78</b>	<b>697</b>
<i>Cash balance at end of year comprises:</i>					
Cash and on call deposits	98	746	738	78	697
<b>CASH, CASH EQUIVALENTS AT END OF YEAR</b>	<b>98</b>	<b>746</b>	<b>738</b>	<b>78</b>	<b>697</b>

# Notes to the Financial Statements

For the year ended 30 June 2008

## 1. CORPORATE INFORMATION

The financial statements of Industrial Research Limited Group are for the year ended 30 June 2008. Industrial Research Limited is a limited liability entity registered under the Companies Act 1993 incorporated and domiciled in New Zealand. The address of the registered office is Gracefield Research Centre, 69 Gracefield Road, Lower Hutt.

Industrial Research Limited operates as a Crown Research Institute that uses world-class research and advanced technology to assist industry and add value to New Zealand's economy.

These consolidated financial statements have been approved for issue by the Board of Directors on 5 September 2008.

The entity's owners do not have the power to amend these financial statements once issued.

### Basis of preparation

The financial statements have been prepared in accordance with generally accepted accounting practice in New Zealand and the requirements of the Companies Act 1993, the Financial Reporting Act 1993, the Crown Entities Act 2004 and the Crown Research Institutes Act 1993. The financial statements have also been prepared on a historical cost basis, except for derivative financial instruments which are at fair value through profit and loss.

The financial statements are presented in New Zealand dollars and all values are rounded to the nearest thousand dollars (\$000).

#### (a) Standards adopted early by the Group

No standards have been adopted by the Group before the effective date of the standards.

#### (b) Standards, amendments and interpretations to existing standards that are not yet effective and have not been early adopted by the Group

The following standards, amendments and interpretations to existing standards have been published and are mandatory for the Group's accounting periods beginning on or after 1 January 2008 or later periods, but the Group has not early adopted them:

- NZ IAS 23 (amendment), "Borrowing costs" (effective from 1 January 2009). The amendment to the standard is still subject to endorsement by the European Union. It requires an entity to capitalise borrowing costs directly attributable to the acquisition, construction or production of a qualifying asset (one that takes a substantial period of time to get ready for use or sale) as part of the cost of that asset. The option of immediately expensing those borrowing costs will be removed. The Group will apply IAS 23 (Amended) from 1 July 2009 but is currently not applicable to the Group as there are no qualifying assets.
- NZ IFRS 8, "Operating segments" (effective from 1 January 2009). IFRS 8 replaces IAS 14 and aligns segment reporting with the requirements of the US standard SFAS 131, "Disclosures about segments of an enterprise and related information". The new standard requires a "management approach", under which segment information is presented on the same basis as that used for internal reporting purposes. The Group will apply NZ IFRS 8 from 1 January 2009. The expected impact is still being assessed in detail by management, but it appears likely that the number of reportable segments, as well as the manner in which the segments are reported, will change in a manner that is consistent with the internal reporting provided to the chief operating decision-maker.

### Statement of compliance

The financial statements comply with generally accepted accounting practice in New Zealand, which includes New Zealand equivalents to International Financial Reporting Standards ("NZ IFRS") as applicable for profit oriented entity. Compliance with NZ IFRS ensures that the financial statements comply with International Financial Reporting Standards ("IFRSs").

This is the first set of financial statements prepared based on NZ IFRS, and comparatives for the year ended 30 June 2007 have been restated accordingly. Reconciliations of previously reported equity under NZ FRS as at 30 June 2007 and 30 June 2006, and net deficit as at 30 June 2007 to the balances reported in the 30 June 2008 financial statements are detailed in note 2 below.

## Basis of consolidation

The consolidated financial statements comprise the financial statements of Industrial Research Limited and its subsidiaries, associates and joint ventures as at 30 June each year ("the Group"). Subsidiaries are all those entities over which the Group has the power to govern the financial and operations policies generally accompanying a shareholding of more than half of the voting rights. The financial statements of subsidiaries are prepared for the same reporting period as the parent company, using consistent accounting policies.

All inter-company balances and transactions, including unrealised profits arising from intra-group transactions, have been eliminated in full. Unrealised losses are also eliminated but considered an impairment indicator of the asset transferred.

Where there is loss of control of a subsidiary, the consolidated financial statements include the results for the part of the reporting year during which Industrial Research Limited has control.

The purchase method is used to account for the acquisition of subsidiaries by the Group. The cost of an acquisition is measured at fair value of the assets given and liabilities incurred at the date of exchange. Identifiable assets and liabilities assumed in a business combination are measured initially at their fair value at the acquisition date.

## Investment in associate

Associates are all entities over which the Group has significant influence but not control, generally accompanying a shareholding of between 20% and 50% of the voting rights.

The group investment in associates is accounted for under the equity method of accounting in the consolidated financial statements.

The financial statements of the associate are used by the Group to apply the equity method. The reporting dates of the associate and the Group are identical and both use consistent accounting policies.

The investment in the associate is carried in the balance sheet at cost plus post-acquisition changes in the Group's share of net assets of the associate, less any impairment in value. The consolidated income statement reflects the Group's share of the results of operations of the associate.

Where there has been a change recognised directly in the associate's equity, the Group recognises its share of any changes and discloses this, when applicable, in the consolidated statement of changes in equity.

## Interest in joint venture operation

The Group's interest in jointly controlled entities is accounted for by proportionate consolidation. The Group combines its share of the joint venture's individual income and expenses, assets and liabilities and cash flow on a line by line basis with similar items in the Group financial statements.

## Foreign currency translation

Both the functional and presentation currency of Industrial Research Limited and its subsidiaries is New Zealand dollars (\$).

Transactions in foreign currencies are initially recorded in the functional currency at the exchange rates ruling at the date of the transaction. Monetary assets and liabilities denominated in foreign currencies are retranslated at the rate of exchange ruling at the balance sheet date.

All differences in the consolidated financial statements are taken to the income statement.

Non-monetary items that are measured in terms of historical cost in a foreign currency are translated using the exchange rate as at the date of the initial transaction.

Non-monetary items measured at fair value in a foreign currency are translated using the exchange rates at the date when the fair value was determined.

As at the reporting date the assets and liabilities of overseas subsidiaries are translated into the presentation currency of Industrial Research Limited at the rate of exchange ruling at the balance sheet date and the income statements are translated at the weighted average exchange rates for the year.

The exchange differences arising on the retranslation are taken directly to a separate component of equity.

On disposal of a foreign entity, the deferred cumulative amount recognised in equity relating to that particular foreign operation is recognised in the income statement.

## Property, plant and equipment

Land, buildings, plant and equipment are stated at historical cost less accumulated depreciation and any impairment in value. Historical cost includes expenditure that is directly attributable to the acquisition of the items. Subsequent costs are included in the asset's carrying value only when it is probable that future economic benefits associated with the item will flow to the Group and the cost of the item can be measured reliably.

The cost of self-constructed assets includes the cost of all materials used in construction, direct labour on the project, costs of obtaining Resource Management Act consents, financing costs that are directly attributable to the project and an appropriate proportion of variable and fixed overheads. Costs cease to be capitalised as soon as the asset is ready for productive use and do not include any inefficiency costs.

Depreciation rates and residual values are reviewed every year and are calculated on a straight-line basis to allocate their cost to their residual values over the estimated useful life of the asset as follows:

	Estimated useful life	Depreciation basis
Land is not depreciated		
Freehold buildings	10 to 40 years (dependent on age)	Straight line
Building auxiliary services	10 to 20 years	Straight line
Computer equipment	3 to 5 years	Straight line
Plant and scientific equipment	3 to 15 years	Straight line
Motor vehicles	3 to 5 years	Straight line
Office furniture, fittings and equipment	3 to 5 years	Straight line

### Impairment

The carrying values of plant and equipment are reviewed for impairment when events or changes in circumstances indicate the carrying value may not be recoverable.

For an asset that does not generate largely independent cash inflows, the recoverable amount is determined for the cash-generating unit to which the asset belongs.

If any such indication exists and where the carrying values exceed the estimated recoverable amount, the assets or cash-generating units are written down to their recoverable amount. Impairment losses are recognised in the income statement.

The recoverable amount of plant and equipment is the greater of fair value less costs to sell and value in use. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset.

Any gain or loss arising on derecognition of the asset (calculated as the difference between the net disposal proceeds and the carrying amount of the item) is included in the income statement in the year the item is derecognised.

### Borrowing costs

Borrowing costs are recognised as an expense when incurred.

### Intangible assets

#### (a) Acquired both separately and from a business combination

Intangible assets acquired separately are capitalised at cost and from a business combination are capitalised at fair value as at the date of acquisition. Following initial recognition, the cost model is applied to all intangible assets.

The useful lives of these intangible assets are assessed to be either finite or indefinite.

Where amortisation is charged on assets with finite lives, this expense is taken to the income statement through the "amortisation of intangible assets" line item.

Intangible assets, excluding development costs, created within the business are not capitalised and expenditure is charged to the income statement in the year in which the expenditure is incurred.

Intangible assets are tested for impairment where an indicator of impairment exists, and in the case of indefinite lived intangibles annually, either individually or at the cash-generating unit level. Useful lives are also examined on an annual basis and adjustments, where applicable, are made on a prospective basis.

#### **(b) Research and development costs**

Research costs are expensed as incurred.

Development expenditure incurred on an individual project is carried forward when its future recoverability can reasonably be regarded as assured.

Following the initial recognition of the development expenditure from the point at which the asset is ready to use, the cost model is applied requiring the asset to be carried at cost less any accumulated amortisation and accumulated impairment losses.

Any expenditure capitalised is amortised over the period of expected future sales from the related project from the point the asset is ready for use.

The amortisation period and amortisation method for development costs is reviewed at each financial year-end. If the useful life or method of consumption is different from the previous assessment, changes are made accordingly. The carrying value of development costs is reviewed for indicators of impairment annually.

#### **(c) Computer software**

Acquired computer software licences are capitalised on the basis of the costs incurred to acquire and right to use the specific software.

Computer software development costs recognised as assets are amortised over their estimated useful lives (not exceeding three years).

Gains or losses arising from derecognition of an intangible asset are measured as the difference between the net disposal proceeds and the carrying amount of the asset and are recognised in the income statement when the asset is derecognised.

### **Recoverable amount of non-current assets**

At each reporting date, the Group assesses whether there is any indication that an asset may be impaired. Where an indicator of impairment exists, the Group makes a formal estimate of recoverable amount. Where the carrying amount of an asset exceeds its recoverable amount the asset is considered impaired and is written down to its recoverable amount.

Recoverable amount is the greater of fair value less costs to sell and value in use. It is determined for an individual asset, unless the asset's value in use cannot be estimated to be close to its fair value less costs to sell and it does not generate cash inflows that are largely independent of those from other assets or groups of assets, in which case the recoverable amount is determined for the cash-generating unit to which the asset belongs.

In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset.

### **Financial assets**

The Group classifies its financial assets in the following categories: at fair value through profit or loss, loans and receivables, and available for sale. The classification depends on the purpose for which the financial assets were acquired. Management determines the classification of its financial assets at initial recognition.

#### **(a) Financial assets at fair value through profit or loss**

Financial assets at fair value through profit or loss are financial assets held for trading. A financial asset is classified in this category if acquired principally for the purpose of selling in the short term. Derivatives are also categorised as held for trading unless they are designated as hedges. Assets in this category are classified as current assets.

#### **(b) Loans and receivables**

Loans and receivables are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market. They are included in current assets, except for maturities greater than 12 months after the balance sheet date. These are classified as non-current assets.

The Group's loans and receivables comprise 'trade and other receivables' and cash and cash equivalents in the balance sheet (notes 7 and 9).

### (c) Available-for-sale financial assets

Available-for-sale financial assets are non-derivatives that are either designated in this category or not classified in any of the other categories. They are included in non-current assets unless management intends to dispose of the investment within 12 months of the balance sheet date. The company has no such assets.

Regular purchases and sales of financial assets are recognised on the trade date, the date on which the Group commits to purchase or sell the asset. Investments are initially recognised at fair value plus transaction costs for all financial assets not carried at fair value through profit or loss.

Financial assets carried at fair value through profit or loss are initially recognised at fair value and transaction costs are expensed in the income statement. Financial assets are derecognised when the rights to receive cash flows from the investments have expired or have been transferred and the Group has transferred substantially all risks and rewards of ownership. Available-for-sale financial assets and financial assets at fair value through profit or loss are subsequently carried at fair value.

Loans and receivables are carried at amortised cost using the effective interest method.

Gains or losses arising from changes in the fair value of the “financial assets at fair value through profit or loss” category are presented in the income statement within “other (losses)/gains – net” in the period in which they arise. Dividend income from financial assets at fair value through profit or loss is recognised in the income statement as part of other income when the group’s right to receive payments is established.

Changes in the fair value of monetary securities denominated in a foreign currency and classified as available-for-sale are analysed between translation differences resulting from changes in amortised cost of the security and other changes in the carrying amount of the security. The translation differences on monetary securities are recognised in profit or loss, while translation differences on non-monetary securities are recognised in equity. Changes in the fair value of monetary and non-monetary securities classified as available-for-sale are recognised in equity.

When securities classified as available-for-sale are sold or impaired, the accumulated fair value adjustments recognised in equity are included in the income statement as “gains and losses from investment securities”.

Interest on available-for-sale securities calculated using the effective interest method is recognised in the income statement as part of other income. Dividends on available-for-sale equity instruments are recognised in the income statement as part of other income when the Group’s right to receive payments is established.

The fair values of quoted investments are based on current bid prices. If the market for a financial asset is not active (and for unlisted securities), the Group establishes fair value by using valuation techniques. These include the use of recent arm’s length transactions, reference to other instruments that are substantially the same, discounted cash flow analysis, and option pricing models making maximum use of market inputs and relying as little as possible on entity-specific inputs.

The Group assesses at each balance sheet date whether there is objective evidence that a financial asset or a group of financial assets is impaired. In the case of equity securities classified as available-for-sale, a significant or prolonged decline in the fair value of the security below its cost is considered as an indicator that the securities are impaired. If any such evidence exists for available-for-sale financial assets, the cumulative loss – measured as the difference between the acquisition cost and the current fair value, less any impairment loss on that financial asset previously recognised in profit or loss – is removed from equity and recognised in the income statement. Impairment losses recognised in the income statement on equity instruments are not reversed through the income statement.

## Inventories

Inventories are valued at the lower of cost and net realisable value.

Costs incurred in bringing each item to its present location and condition are accounted for as follows:

- Raw materials – purchase cost on a first-in, first-out basis
- Work-in-progress – cost of direct materials and labour and a proportion of manufacturing overheads based on normal operating capacity but excluding borrowing costs.

Net realisable value is the estimated selling price in the ordinary course of business, less estimated costs of completion and the estimated costs necessary to make the sale.

## Trade and other receivables

Trade receivables, which generally have 30-90 day terms, are recognised and carried at original invoice amount less an allowance for any uncollectible amounts.

An estimate for doubtful debts is made when collection of the full amount is no longer probable. Bad debts are expensed to the income statement when identified.

## Cash and cash equivalents

Cash and short-term deposits in the balance sheet comprise cash at bank and in hand and short-term deposits with an original maturity of three months or less.

For the purposes of the Cash Flow Statement, cash and cash equivalents consist of cash and cash equivalents as defined above, net of outstanding bank overdrafts.

## Interest-bearing loans and borrowings

All loans and borrowings are initially recognised at cost, being the fair value of the consideration received net of issue costs associated with the borrowing.

After initial recognition, interest-bearing loans and borrowings are subsequently measured at amortised cost using the effective interest method. Amortised cost is calculated by taking into account any issue costs, and any discount or premium on settlement.

Gains and losses are recognised in the income statement when the liabilities are derecognised as well as through the amortisation process.

## Provisions

Provisions are recognised when the Group has a present obligation (legal or constructive) as a result of a past event. It is probable that an outflow of resources embodying economic benefits will be required to settle the obligation and a reliable estimate can be made of the amount of the obligation.

Where the Group expects some or all of a provision to be reimbursed, for example under an insurance contract, the reimbursement is recognised as a separate asset but only when the reimbursement is virtually certain. The expense relating to any provision is presented in the income statement net of any reimbursement.

If the effect of the time value of money is material, provisions are determined by discounting the expected future cash flows at a pre-tax rate that reflects current market assessments of the time value of money and, where appropriate, the risks specific to the liability.

Where discounting is used, the increase in the provision due to the passage of time is recognised as a finance cost.

## Leases

Finance leases, which transfer to the Group substantially all the risks and benefits incidental to ownership of the leased item, are capitalised at the inception of the lease at the fair value of the leased property or, if lower, at the present value of the minimum lease payments.

Lease payments are apportioned between the finance charges and reduction of the lease liability so as to achieve a constant rate of interest on the remaining balance of the liability. Finance charges are included in the income statement as finance costs.

Capitalised leased assets are depreciated over the shorter of the estimated useful life of the asset and the lease term.

Leases where the lessor retains substantially all the risks and benefits of ownership of the asset are classified as operating leases. Initial direct costs incurred in negotiating an operating lease are added to the carrying amount of the leased asset and recognised over the lease term on the same basis as the lease income.

Operating lease payments are recognised as an expense in the income statement on a straight-line basis over the lease term.

## Revenue

Revenue is recognised to the extent that it is probable that the economic benefits will flow to the Group and the revenue can be reliably measured. The following specific recognition criteria must also be met before revenue is recognised:

## Grants

Grants received are recognised in the income statement when the requirements under the grant agreement have been met. Any grants for which the requirements have not been completed are carried as liabilities until all conditions have been fulfilled.

Government grants are recognised at their fair value where there is reasonable assurance that the grant will be received and all attaching conditions will be complied with.

When the grant relates to an expense item, it is recognised as income over the periods necessary to match the grant on a systematic basis to the costs that it is intended to compensate.

Where the grant relates to an asset, the fair value is credited to a deferred income account and is released to the income statement over the expected useful life of the relevant asset by equal annual instalments.

## Rendering of services

Revenue from research contract services is recognised by reference to the stage of completion. Stage of completion is measured by reference to labour hours incurred to date as a percentage of total estimated labour hours for each contract.

Where the contract outcome cannot be measured reliably, revenue is recognised only to the extent of the expenses recognised that are recoverable.

## Interest

Interest income is recognised as the interest accrues (using the effective interest method which is the rate that exactly discounts estimated future cash receipts through the expected life of the financial instrument) to the net carrying amount of the financial asset.

## Dividend incomes

Dividend income is recognised when the shareholders' right to receive the payment is established.

## Employee benefits

### (a) Bonus plans

The Group recognises a liability and expense for bonuses based on a formula that takes into consideration the profit attributable to the Company's shareholder. The Group recognises a provision where contractually obliged or where there is a past practice that has created a constructive obligation.

### (b) Termination benefits

Termination benefits are payable when employment is terminated by the Group before the normal retirement age or whenever an employee accepts voluntary redundancy in exchange for these benefits. The Group recognises termination benefits when it is demonstrably committed to either: terminating the employment of current employees according to a detailed formal plan without possibility of withdrawal; or providing termination benefits as a result of an offer made to encourage voluntary redundancy. Benefits falling due more than 12 months after the balance date are discounted to their present value.

### (c) Long service leave and retiring grants

Long service leave and retiring grants are payable to employees who were employed by the Department of Scientific and Industrial Research prior to 1 July 1992. These obligations are valued annually by completion of an independent actuary valuation or by internal valuation.

## Income tax

Deferred income tax is provided in full using the liability method on all temporary differences at the balance sheet date between the tax bases of assets and liabilities and their carrying amounts for financial reporting purposes.

Deferred income tax liabilities is provided in full for all taxable temporary differences

- except if it arises from initial recognition of an asset or liability in a transaction other than a business combination that at the time of the transaction effects neither accounting or taxable profit nor loss;

- in respect of taxable temporary differences associated with investments in subsidiaries, associates and interests in joint ventures, except where the timing of the reversal of the temporary differences can be controlled and it is probable that the temporary differences will not reverse in the foreseeable future.

Deferred income tax assets are recognised for all deductible temporary differences, carry-forward of unused tax assets and unused tax losses, to the extent that it is probable that taxable profit will be available against which the deductible temporary differences, and the carry-forward of unused tax assets and unused tax losses can be utilised.

The carrying amount of deferred income tax assets is reviewed at each balance sheet date and reduced to the extent that it is no longer probable that sufficient taxable profit will be available to allow all or part of the deferred income tax asset to be utilised.

Deferred income tax assets and liabilities are measured at the tax rates that are expected to apply to the year when the asset is realised or the liability is settled, based on tax rates (and tax laws) that have been enacted or substantively enacted at the balance sheet date.

Income tax relating to items recognised directly in equity is recognised in equity and not in the income statement.

## Goods and services tax

Revenues, expenses and assets are recognised net of the amount of GST except where the GST incurred on a purchase of goods and services is not recoverable from the taxation authority, in which case the GST is recognised as part of the cost of acquisition of the asset or as part of the expense item as applicable.

Receivables and payables are stated with the amount of GST included.

The net amount of GST recoverable from, or payable to, the taxation authority is included as part of receivables or payables in the balance sheet.

Cash flows are included in the Cash Flow Statement on a gross basis and the GST component of cash flows arising from investing and financing activities, which is recoverable from, or payable to, the taxation authority, are classified as operating cash flows.

Commitments and contingencies are disclosed net of the amount of GST recoverable from, or payable to, the taxation authority.

## Derecognition of financial instruments

The derecognition of a financial instrument takes place when the Group no longer controls the contractual rights that comprise the financial instrument, which is normally the case when the instrument is sold, or all the cash flows attributable to the instrument are passed through to an independent third party.

## Derivative financial instruments

The Group enters into derivative financial instruments such as foreign currency contracts. Such derivative financial instruments are stated at fair value.

The fair value of forward exchange contracts is calculated by reference to current forward exchange rates for contracts with similar maturity profiles.

The Group's derivative financial instruments are not designated as hedging instruments for accounting purposes. Accordingly, derivative financial instruments are reported as financial instruments at fair value through the income statement.

## Transition to NZ IFRS

Industrial Research Limited financial statements for the year ended 30 June 2008 are the first financial statements that comply with NZ IFRS. Industrial Research Limited has applied NZ IFRS 1 in preparing these financial statements.

Industrial Research Limited transition date is 1 July 2006. Industrial Research Limited prepared its opening NZ IFRS balance sheet at that date. The reporting date of these financial statements is 30 June 2008. The Industrial Research Limited NZ IFRS adoption date is 1 July 2007.

In preparing these consolidated financial statements in accordance with NZ IFRS 1, Industrial Research Limited has applied the mandatory exceptions and certain optional exemptions from full retrospective application of NZ IFRS.

## Exemptions from full retrospective application elected by Industrial Research Limited

Industrial Research Limited has elected to apply the following optional exemptions from full retrospective application:

A. Business combinations exemption

Industrial Research Limited has applied the business combinations exemption in NZ IFRS 1. It has not restated business combinations that took place prior to the 1 July 2006 transition date.

Industrial Research Limited is required to make the following mandatory exception from retrospective application:

B. Estimates exception

Estimates under NZ IFRS at 1 July 2006 are consistent with estimates made for the same date under previous NZ GAAP.

## 2. EXPLANATION OF TRANSITION TO NZ IFRS

Industrial Research Limited financial statements for the year ended 30 June 2008 are the first financial statements that comply with NZ IFRS. Below is a summary of impact of the transition to NZ IFRS on the balance sheet for the parent and group and income statement for the parent and group.

### Reconciliation of equity – Parent

Notes	Previous NZ FRS 1 July 2006 \$000	Effect on Transition to NZ IFRS 1 July 2006 \$000	NZ IFRS 1 July 2006 \$000	Previous NZ FRS 1 July 2007 \$000	Effect on Transition to NZ IFRS 1 July 2007 \$000	NZ IFRS 1 July 2007 \$000
<b>ASSETS</b>						
<b>Current assets</b>						
	2,148	-	2,148	697	-	697
	6,202	-	6,202	3,514	-	3,514
	982	-	982	870	-	870
	157	(157)	-	-	-	-
	<b>9,489</b>	<b>(157)</b>	<b>9,332</b>	<b>5,081</b>	<b>-</b>	<b>5,081</b>
<b>Non-current assets</b>						
	8,000	-	8,000	11,310	-	11,310
	364	-	364	-	-	-
	148	-	148	254	-	254
	-	-	-	350	-	350
	675	-	675	-	-	-
a,b	33,234	2,235	35,469	33,532	(809)	32,723
a	3,078	(3,078)	-	-	-	-
b	-	1,000	1,000	-	809	809
	2,700	-	2,700	-	-	-
	<b>48,199</b>	<b>157</b>	<b>48,356</b>	<b>45,446</b>	<b>-</b>	<b>45,446</b>
	<b>57,688</b>	<b>-</b>	<b>57,688</b>	<b>50,527</b>	<b>-</b>	<b>50,527</b>
<b>LIABILITIES</b>						
<b>Current liabilities</b>						
	8,022	-	8,022	5,080	-	5,080
	629	-	629	569	-	569
c	3,212	26	3,238	2,673	67	2,740
	<b>11,863</b>	<b>26</b>	<b>11,889</b>	<b>8,322</b>	<b>67</b>	<b>8,389</b>
<b>Non-current liabilities</b>						
	881	-	881	616	-	616
	9,035	-	9,035	9,209	-	9,209
	12,665	-	12,665	11,873	-	11,873
	<b>22,581</b>	<b>-</b>	<b>22,581</b>	<b>21,698</b>	<b>-</b>	<b>21,698</b>
	<b>34,444</b>	<b>26</b>	<b>34,470</b>	<b>30,020</b>	<b>67</b>	<b>30,087</b>
	<b>23,244</b>	<b>(26)</b>	<b>23,218</b>	<b>20,507</b>	<b>(67)</b>	<b>20,440</b>

## EQUITY

Share capital		24,250	-	24,250	24,560	-	24,560
Retained earnings	c	(1,006)	(26)	(1,032)	(4,053)	(67)	(4,120)
<b>Total equity attributable to Parent</b>		<b>23,244</b>	<b>(26)</b>	<b>23,218</b>	<b>20,507</b>	<b>(67)</b>	<b>20,440</b>

## Explanatory notes – Reconciliation of equity

### a. Properties held for resale

Properties previously classified as intended for resale no longer meet the definition of property intended for resale under NZ IFRS.

Book value of \$3,078,000 and \$157,000 has been transferred back to property, plant and equipment.

### b. Intangible assets

Computer software was classified as part of property, plant and equipment under previous NZ FRS. The net book value of computer software reclassified as an intangible asset on transition to NZ IFRS is \$1,000,000 at 30 June 2006 and at 30 June 2007, \$809,000.

### c. Sick leave

Sick leave was not recognised as a liability under previous NZ FRS. NZ IAS 19 requires Industrial Research Limited to recognise employees' unused sick leave entitlement that can be carried forward at balance date, to the extent that Industrial Research Limited anticipates it will be used by staff to cover future absences. The deferred tax effect of this adjustment, \$22,000, has not been recognised.

## Reconciliation of equity – Group

		Previous NZ FRS	Effect on Transition to NZ IFRS	NZ IFRS	Previous NZ FRS	Effect on Transition to NZ IFRS	NZ IFRS
	Notes	1 July 2006 \$000	1 July 2006 \$000	1 July 2006 \$000	1 July 2007 \$000	1 July 2007 \$000	1 July 2007 \$000
<b>ASSETS</b>							
<b>Current assets</b>							
Cash and cash equivalents		2,300	-	2,300	738	-	738
Trade and other receivables		6,831	-	6,831	3,519	-	3,519
Inventories		1,088	-	1,088	870	-	870
Property, plant and equipment held for sale		406	(406)	-	-	-	-
<b>Total current assets</b>		<b>10,625</b>	<b>(406)</b>	<b>10,219</b>	<b>5,127</b>	<b>-</b>	<b>5,127</b>
<b>Non-current assets</b>							
Investment in associates		628	-	628	812	-	812
Other investments		148	-	148	254	-	254
Accounts receivable		-	-	-	350	-	350
Property, plant and equipment	a,b	33,234	2,484	35,718	33,532	(809)	32,723
Property, plant and equipment held for sale	a	3,078	(3,078)	-	-	-	-
Intangible assets	b	-	1,000	1,000	-	809	809
Deferred tax		2,700	-	2,700	-	-	-
<b>Total non-current assets</b>		<b>39,788</b>	<b>406</b>	<b>40,194</b>	<b>34,948</b>	<b>-</b>	<b>34,948</b>
<b>Total Assets</b>		<b>50,413</b>	<b>-</b>	<b>50,413</b>	<b>40,075</b>	<b>-</b>	<b>40,075</b>

Notes	Previous NZ FRS 1 July 2006 \$000	Effect on Transition to NZ IFRS 1 July 2006 \$000	NZ IFRS 1 July 2006 \$000	Previous NZ FRS 1 July 2007 \$000	Effect on Transition to NZ IFRS 1 July 2007 \$000	NZ IFRS 1 July 2007 \$000
<b>LIABILITIES</b>						
<b>Current liabilities</b>						
	8,143	-	8,143	5,085	-	5,085
	798	-	798	569	-	569
c	3,313	26	3,339	2,675	67	2,742
	<b>12,254</b>	<b>26</b>	<b>12,280</b>	<b>8,329</b>	<b>67</b>	<b>8,396</b>
<b>Non-current liabilities</b>						
	881	-	881	616	-	616
	12,665	-	12,665	11,873	-	11,873
	<b>13,546</b>	<b>-</b>	<b>13,546</b>	<b>12,489</b>	<b>-</b>	<b>12,489</b>
	<b>25,800</b>	<b>26</b>	<b>25,826</b>	<b>20,818</b>	<b>67</b>	<b>20,885</b>
	<b>24,613</b>	<b>(26)</b>	<b>24,587</b>	<b>19,257</b>	<b>(67)</b>	<b>19,190</b>
<b>EQUITY</b>						
	24,250	-	24,250	24,560	-	24,560
	(24)	-	(24)	-	-	-
c	387	(26)	361	(5,303)	(67)	(5,370)
	<b>24,613</b>	<b>(26)</b>	<b>24,587</b>	<b>19,257</b>	<b>(67)</b>	<b>19,190</b>

### Explanatory notes – Reconciliation of equity

a. Properties held for resale

Properties previously classified as intended for resale no longer meet the definition of property intended for resale under NZ IFRS.

Book value of \$3,078,00 and \$406,000 has been transferred back to property, plant and equipment.

b. Intangible assets

Computer software was classified as part of property, plant and equipment under previous NZ FRS. The net book value of computer software reclassified as an intangible asset on transition to NZ IFRS is \$1,000,000 at 30 June 2006 and at 30 June 2007, \$809,000.

c. Sick leave

Sick leave was not recognised as a liability under previous NZ FRS. NZ IAS 19 requires Industrial Research Limited to recognise employees' unused sick leave entitlement that can be carried forward at balance date, to the extent that Industrial Research Limited anticipates it will be used by staff to cover future absences. The deferred tax effect of this adjustment, \$22,000, has not been recognised.

## Reconciliation of profit/loss for the year ended 30 June 2007

	Notes	GROUP			PARENT		
		Previous NZ FRS	Effect on Transition to NZ IFRS	NZ IFRS	Previous NZ FRS	Effect on Transition to NZ IFRS	NZ IFRS
		30 June 2007 \$000	30 June 2007 \$000	30 June 2007 \$000	30 June 2007 \$000	30 June 2007 \$000	30 June 2007 \$000
Income							
Rendering of services – Crown		38,632	-	38,632	38,632	-	38,632
Rendering of services – Commercial		14,337	-	14,337	14,279	-	14,279
Investment income		48	-	48	47	-	47
Gain on disposal of property plant, and equipment		1,060	-	1,060	1,062	-	1,062
<b>Total income</b>		<b>54,077</b>	<b>-</b>	<b>54,077</b>	<b>54,020</b>	<b>-</b>	<b>54,020</b>
Operating expenditure	a	(57,046)	(41)	(57,087)	(54,383)	(41)	(54,424)
Profit/(loss) before tax		(2,969)	(41)	(3,010)	(363)	(41)	(404)
Income tax expense		(2,700)	-	(2,700)	(2,700)	-	(2,700)
<b>Profit/(loss) after tax</b>		<b>(5,669)</b>	<b>(41)</b>	<b>(5,710)</b>	<b>(3,063)</b>	<b>(41)</b>	<b>(3,104)</b>

### a. Sick leave

Sick leave was not recognised as a liability under previous NZ FRS. NZ IAS 19 requires Industrial Research Limited to recognise employees' unused sick leave entitlement that can be carried forward at balance date, to the extent that Industrial Research Limited anticipates it will be used by staff to cover future absences.

## 3. REVENUE AND OTHER INCOME

	GROUP		PARENT	
	2008	2007	2008	2007
	ACTUAL \$000	ACTUAL \$000	ACTUAL \$000	ACTUAL \$000
<b>REVENUE</b>				
<b>Crown revenue</b>				
Foundation for Research, Science and Technology	33,862	32,509	33,862	32,509
Ministry of Research, Science and Technology	5,763	5,512	5,763	5,512
The Royal Society of New Zealand	580	611	580	611
<b>Total Crown</b>	<b>40,205</b>	<b>38,632</b>	<b>40,205</b>	<b>38,632</b>
<b>Commercial revenue</b>				
Commercial – domestic	7,303	7,046	7,303	7,010
Commercial – overseas	7,619	4,688	7,619	4,688
Licensing fees	13	1,084	13	1,084
Royalties	365	411	363	406
<b>Total commercial revenue</b>	<b>15,300</b>	<b>13,229</b>	<b>15,298</b>	<b>13,188</b>
<b>Total Revenue</b>	<b>55,505</b>	<b>51,861</b>	<b>55,503</b>	<b>51,820</b>
<b>OTHER INCOME</b>				
Gain on sale of property, plant and equipment	8	1,060	8	1,062
Equipment rental	776	489	776	489
Other income	805	619	799	602
<b>Total other income</b>	<b>1,589</b>	<b>2,168</b>	<b>1,583</b>	<b>2,153</b>
<b>TOTAL INCOME FROM CONTINUING ACTIVITIES</b>	<b>57,094</b>	<b>54,029</b>	<b>57,086</b>	<b>53,973</b>

## 4. EXPENDITURE

	GROUP		PARENT	
	2008	2007	2008	2007
	ACTUAL	ACTUAL	ACTUAL	ACTUAL
	\$000	\$000	\$000	\$000
Other operating expenses from continued operations				
Auditors' fees				
– for auditing the financial statements	97	92	95	87
– for other assurance services	-	48	-	48
– for other services	-	11	-	11
Bad debt expense	41	-	41	-
Directors' fees	309	281	231	221
Employee costs				
– Salary and wages	25,492	24,967	25,492	24,879
– Redundancy	143	1,419	143	1,419
Interest expense	660	1,035	1,303	1,035
Movement in provision for doubtful debts	96	(211)	96	(211)
Rent and lease expenses	685	985	685	990
Donations	11	1	11	1
Foreign exchange (gains)/losses	57	80	57	79
Revaluation of investments (gain)/loss	(223)	-	(223)	-
Science project and subcontract costs*	12,195	13,906	12,195	13,855

\* During the year Industrial Research Limited invested \$207,000 in New Zealand Synchrotron Limited. The directors view was that the economic benefits flowing from this investment would be minimal and therefore impaired this investment to \$nil.

## 5. DISCONTINUED ACTIVITIES

On 31 July 2006 the Group sold the business of MPT Solutions, a division of Industrial Research Limited and Materials Performance Technologies Limited. The businesses were not discontinued operations or classified as held for sale as at 30 June 2006 and the comparative revenue below and expenditure have been re-presented to show the discontinued operations separately from continuing operations.

Revenue and expenses after tax are disclosed below.

	GROUP		PARENT	
	2008	2007	2008	2007
	ACTUAL	ACTUAL	ACTUAL	ACTUAL
	\$000	\$000	\$000	\$000
Trading income		941	-	756
Expenses				
Depreciation		12		5
Impairment of assets – reversal		(409)		(409)
Finance costs		1		-
Employee termination costs		836		836
Foreign exchange (gains)		-		(2)
Rental and operating leases		7		-
		-		447
				-
Income tax expense		-		-
Surplus from discontinued operations after income tax		-		494
				-
				326

<b>Business sale</b>	
Total consideration	1,483
Cash	1
Other assets	1,618
Liabilities	(136)
<b>Net assets sold</b>	<b>1,483</b>

## 6. TAXATION

	GROUP		PARENT	
	2008	2007	2008	2007
	ACTUAL	ACTUAL	ACTUAL	ACTUAL

Major components of income tax expense for the years ended 30 June 2008 and 30 June 2007

### Income statement

#### Current income tax

Current income tax charge/(credit)	587	(1,017)	587	(1,017)
Derecognition of losses	(524)	1,090	(524)	1,090
Derecognition of temporary differences	(63)	2,627	(63)	2,627
<b>Total tax expense reported in the income statement</b>	<b>-</b>	<b>2,700</b>	<b>-</b>	<b>2,700</b>

### Reconciliation of income tax expense

Profit/(loss) attributable to members of the Parent	543	(5,710)	207	(730)
Income tax expense	-	(2,700)	-	(2,700)
Profit/(loss) before income tax	543	(3,504)	207	(730)
Tax at current rate of 33%	179	(1,156)	67	(241)
Adjustment to taxation:				
Capital gains	(74)	(363)	(74)	(1,358)
Non-deductible expenses	151	141	151	130
Fair dividend rate	4	-	4	-
Writedown of investments	-	-	-	47
Loss utilisation by subsidiaries	-	-	195	225
Earnings of associates/joint venture	82	117	-	-
Earnings of foreign subsidiary	-	8	-	-
Prior period adjustments	189	271	189	215
Revaluation of investments	-	(35)	-	(35)
Derecognition of losses	(502)	1,090	(503)	1,090
Derecognition of temporary differences	(29)	2,627	(29)	2,627
<b>Total tax expense</b>	<b>-</b>	<b>2,700</b>	<b>-</b>	<b>2,700</b>
Tax expense from continuing operations	-	2,700	-	2,700

The corporate tax rate in New Zealand has changed from 33% to 30% effective from 1 April 2008.

### Unrecognised deferred tax assets

	GROUP		PARENT	
	2008	2007	2008	2007
	ACTUAL	ACTUAL	ACTUAL	ACTUAL

Deferred tax assets have not been recognised in respect of the following items:

Unrecognised temporary differences (note 19)	7,712	8,018	7,712	8,018
Tax losses	13,552	14,779	13,552	14,779

## 7. CASH AND CASH EQUIVALENTS

	GROUP		PARENT	
	2008	2007	2008	2007
	ACTUAL	ACTUAL	ACTUAL	ACTUAL
	\$000	\$000	\$000	\$000
Cash at bank and in hand	98	738	78	697
<b>CASH, CASH EQUIVALENTS AT END OF PERIOD</b>	<b>98</b>	<b>738</b>	<b>78</b>	<b>697</b>

## 8. EQUITY

	GROUP		PARENT	
	2008	2007	2008	2007
	ACTUAL	ACTUAL	ACTUAL	ACTUAL
	\$000	\$000	\$000	\$000
<b>SHARE CAPITAL</b>				
Balance at beginning of year	24,560	24,250	24,560	24,250
Share Issue made during period	8,280	310	8,280	310
<b>CLOSING SHARE CAPITAL</b>	<b>32,840</b>	<b>24,560</b>	<b>32,840</b>	<b>24,560</b>
<b>RESERVES</b>				
Foreign currency translation reserve				
Balance at beginning of year	-	(24)	-	(24)
Current period adjustment	-	(13)	-	(13)
Transfer on sale of subsidiary	-	37	-	37
<b>BALANCE AT END OF PERIOD</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>RETAINED EARNINGS</b>				
Balance at beginning of year	(4,800)	947	(3,550)	(446)
Net surplus/(deficit) for the period	543	(5,710)	207	(3,104)
Amalgamation of subsidiary	-	-	2,307	-
Transfer from currency translation reserve	-	(37)	-	-
<b>BALANCE AT END OF PERIOD</b>	<b>(4,257)</b>	<b>(4,800)</b>	<b>(1,036)</b>	<b>(3,550)</b>
<b>TOTAL EQUITY</b>				
Balance at beginning of year	19,760	25,173	21,010	23,780
Movements during period	8,823	(5,413)	10,794	(2,770)
<b>BALANCE AT END OF PERIOD</b>	<b>28,583</b>	<b>19,760</b>	<b>31,804</b>	<b>21,010</b>
<b>SHARE CAPITAL</b>				
Issued and paid up capital	2008	2008	2007	2007
Movements in the Company's issued ordinary shares were as follows:	Number	\$000	Number	\$000
Shares at beginning of year	21,763,454	24,560	21,549,660	24,250
Shares issued during period	8,808,510	8,280	213,794	310
<b>SHARES AT THE END OF THE PERIOD</b>	<b>30,571,964</b>	<b>32,840</b>	<b>21,763,454</b>	<b>24,560</b>

All issued shares are fully paid and have no par value.

Each share is ranked equally and confers on the holder the right to vote at any general meeting of the Company.

On 20 November 2007 the Company issued 297,872 shares at \$0.94 per share to the Crown.

On 18 December 2007 the Company issued 8,510,638 shares at \$0.94 per share to the Crown.

## FOREIGN CURRENCY TRANSLATION RESERVE

Translation differences arising on the retranslation of the results of subsidiaries with functional currencies other than New Zealand dollars are recognised directly in the Foreign Currency Translation Reserve.

## 9. ACCOUNTS RECEIVABLE AND PREPAYMENTS

	GROUP		PARENT	
	2008	2007	2008	2007
	ACTUAL	ACTUAL	ACTUAL	ACTUAL
	\$000	\$000	\$000	\$000
<b>Current</b>				
Trade receivables	3,296	2,884	3,296	2,884
Less: Provision for doubtful debts	(155)	(62)	(155)	(62)
	<b>3,141</b>	<b>2,822</b>	<b>3,141</b>	<b>2,822</b>
Accrued income	182	65	182	65
Income tax receivable	9	-	9	-
Other receivables	23	27	14	22
Prepayments	846	605	846	605
<b>CURRENT RECEIVABLES</b>	<b>4,201</b>	<b>3,519</b>	<b>4,192</b>	<b>3,514</b>
<b>Non-current</b>				
Settlement due from disposal of subsidiary	350	350	350	350
<b>NON-CURRENT RECEIVABLES</b>	<b>350</b>	<b>350</b>	<b>350</b>	<b>350</b>

The carrying amount of trade receivables are equivalent to fair values.

Trade receivables includes amounts due from related parties. See note 27 for details.

### a. Provision for doubtful debts

At 30 June 2008 trade receivables of \$155,000 were considered impaired. The impaired receivables were from a number of customers.

	GROUP	
	2008	2007
	ACTUAL	ACTUAL
	\$000	\$000
Opening balance	62	737
Recognised during the year	155	73
Released	(35)	(607)
Utilised	(27)	(141)
<b>CLOSING BALANCE</b>	<b>155</b>	<b>62</b>

### b. Past due but not impaired

At 30 June 2008 trade receivables of \$1,093,000 (2007 \$686,000) were past due but not impaired. These relate to a number of independent customers for whom there is no recent history of default.

The aging of trade receivables is as follows;

	GROUP	
	2008	2007
	ACTUAL	ACTUAL
	\$000	\$000
Within 1 month	848	467
Within 1 to 3 months	73	150
Beyond 3 months	172	69
	<b>1,093</b>	<b>686</b>

## 10. PROPERTY, PLANT AND EQUIPMENT

	Land Assets \$000	Building Assets \$000	Plant Assets \$000	Capital Work in Progress \$000	Total Parent \$000	Total Group \$000
<b>1 July 2007</b>						
Cost or valuation	3,001	39,778	35,861	159	78,799	78,799
Accumulated depreciation	-	(17,995)	(27,511)	-	(45,506)	(45,506)
<b>Carrying amount</b>	<b>3,001</b>	<b>21,783</b>	<b>8,350</b>	<b>159</b>	<b>33,293</b>	<b>33,293</b>
<b>For the year ended 30 June 2008</b>						
Carrying amount at 1 July 2007	3,001	21,783	8,350	159	33,293	33,293
Additions	-	250	1,908	664	2,822	2,822
Transfers from capital work in progress	-	72	443	(515)	-	-
Disposals	-	-	(4)	-	(4)	(4)
Depreciation	-	(2,369)	(2,072)	-	(4,441)	(4,441)
<b>Carrying amount 30 June 2008</b>	<b>3,001</b>	<b>19,736</b>	<b>8,625</b>	<b>308</b>	<b>31,670</b>	<b>31,670</b>
Cost or valuation	3,001	41,542	42,960	308	87,811	87,811
Accumulated depreciation	-	(21,806)	(34,335)	-	(56,141)	(56,141)
<b>Carrying amount</b>	<b>3,001</b>	<b>19,736</b>	<b>8,625</b>	<b>308</b>	<b>31,670</b>	<b>31,670</b>

	Land Assets \$000	Building Assets \$000	Plant Assets \$000	Capital Work in Progress \$000	Total Parent \$000	Total Group \$000
<b>1 July 2006</b>						
Cost or valuation	3,001	41,116	41,149	645	85,911	85,911
Accumulated depreciation	-	(15,974)	(29,492)	-	(45,466)	(45,458)
<b>Carrying amount</b>	<b>3,001</b>	<b>25,142</b>	<b>11,657</b>	<b>645</b>	<b>40,445</b>	<b>40,453</b>
<b>Twelve months ended 30 June 2007</b>						
Carrying amount at 1 July 2006	3,001	25,142	11,657	645	39,930	39,930
Additions	-	21	1,603	336	1,960	1,960
Transfers from capital work in progress	-	83	739	(822)	-	-
Disposals	-	-	(246)	-	(246)	(246)
Asset impairment writedown	-	(666)	(3,337)	-	(4,003)	(4,003)
Depreciation	-	(2,797)	(2,066)	-	(4,863)	(4,871)
<b>Carrying amount 30 June 2007</b>	<b>3,001</b>	<b>21,783</b>	<b>8,350</b>	<b>159</b>	<b>33,293</b>	<b>33,293</b>
Cost or valuation	3,001	39,778	35,861	159	78,799	78,799
Accumulated depreciation	-	(17,995)	(27,511)	-	(45,506)	(45,506)
<b>Carrying amount</b>	<b>3,001</b>	<b>21,783</b>	<b>8,350</b>	<b>159</b>	<b>33,293</b>	<b>33,293</b>

### Impairment

In December 2006 assets previously used by BioPharm, a division of Industrial Research Limited, were impaired to their recoverable amount assessed at fair value less costs of disposal. Operations of BioPharm had ceased as at 30 June 2006. BioPharm assets have been transferred to the Group's other operations.

### Restriction on title

In relation to the transfer of land, shareholding Ministers shall have regard to the principles of the Treaty of Waitangi in accordance with section 10 of the Crown Research Institutes Act 1992. The Lower Hutt properties have Treaty of Waitangi caveats registered against their respective titles.

### Insurable values of fixed assets

The Group has established, maintains and regularly reviews comprehensive cover for business insurance. As part of this cover, it insures its fixed assets at either demolition, indemnity or replacement values. In line with other businesses in the Wellington region, the Group faces higher rates of exclusions on the fixed asset replacement policies. For material damage cover in Wellington the excess is 5% (capped at \$2,500,000) of the site value, in Auckland this is 1% and 2.5% for Christchurch. On current insured values this would equate to an excess value of \$2,500,000 of the reinstatement value of \$288 million for buildings, plant and equipment for the Gracefield site.

### Finance leases

Included in plant assets at 30 June 2008 are assets capitalised under finance leases with a cost of \$1,257,000 (30 June 2007: \$2,217,000) together with accumulated depreciation of \$603,000 (30 June 2007: \$1,153,000).

### Prior period adjustment

During the current year a system calculation error was noted such that certain buildings depreciation charge was calculated over a useful life of 15 years rather than 40 years.

This has been corrected as an error and the comparative figures restated, the effect of the adjustment on net profit, equity and the carrying value of fixed assets for 30 June 2007 is shown below;

	2007 \$000
Fixed assets	570
Equity	570
Net (loss) for the year	(16)

## 11. INTANGIBLE ASSETS

	GROUP	PARENT
	2008 Software \$000	2008 Software \$000
Balance at 1 July 2007		
Cost	3,934	3,934
Accumulated amortisation	(3,125)	(3,125)
Opening carrying amount	809	809
For the year ended 30 June 2008		
Additions	494	494
Amortisation charge	(544)	(544)
Balance at 30 June 2008	759	759
Cost	4,428	4,428
Accumulated amortisation	(3,669)	(3,669)
Closing carrying amount	759	759
	GROUP	PARENT
	2007 Software \$000	2007 Software \$000
Balance at 1 July 2006		
Cost	3,782	3,782
Accumulated amortisation	(2,750)	(2,750)
Opening carrying amount	1,032	1,032

#### Year ended 30 June 2007

Additions	328	328
Amortisation charge	(544)	(544)
Disposals – cost	(176)	(176)
Disposals – accumulated depreciation	169	169

#### Balance at 30 June 2007

Cost	3,934	3,934
Accumulated amortisation	(3,125)	(3,125)
Closing carrying amount	809	809

#### Finance leases

Included in intangible assets at 30 June 2008 are assets capitalised under finance leases (leased software) with a cost of \$965,000 (30 June 2007: \$965,000) together with accumulated amortisation of \$806,000 (30 June 2007: \$579,000).

## 12. INVESTMENT IN SUBSIDIARIES

The Parent's investment in subsidiaries comprises shares at cost. Subsidiaries comprise:

Name of entity	Principal activities	Interest held by the Group	
		2008	2007
Measurement Standards Laboratory of New Zealand Limited	Non-operating – name protection	100%	100%
Industrial Research Pty Limited	Non-operating – name protection in Australia	100%	100%
GlycoSyn Technologies Limited	Non-operating – name protection	100%	100%
Superlink Developments Limited	Bare trustee of certain intellectual property	67%	67%
Bio-Sol Limited	Non-operating – for involvement in consortium	100%	100%
Innovation Finance Limited	Equity investment in start-up companies	-	100%
Damping Systems Limited	Earthquake damping technology	-	100%

All subsidiaries have 30 June balance dates.

Industrial Research Pty Limited is incorporated in Australia. All other subsidiary entities are incorporated in New Zealand.

#### Acquisition of subsidiary

On 1 February 2007, the Group acquired for \$1, the shares it did not hold in Damping Systems Limited. Damping Systems Limited has no assets and no liabilities and does not operate. The Board of Directors resolved to close the company on 19 June 2007.

Damping Systems Limited was removed from the New Zealand register of companies on 14 September 2007.

#### Amalgamation of subsidiary

On 14 April 2008, Innovation Finance Limited was amalgamated into the Parent. Until the date of amalgamation, Innovation Finance Limited had been a wholly owned subsidiary of the Parent. Under the amalgamation the Parent took control of all the assets of Innovation Finance Limited and assumed responsibility for its liabilities. Innovation Finance Limited has been removed from the New Zealand register of companies.

## Summary of effect of the amalgamation of Innovation Finance Limited

	PARENT
	2008 \$000
Investment in associate company	3,807
Intercompany receivable	9,812
Accrued expenses	(2)
	<b>13,617</b>
Carrying amount of shares in amalgamated company	(11,310)
Balance recognised in the statement of movements in equity	2,307

## 13. INVESTMENT IN ASSOCIATES

	Interest Held by the Group	
	2008	2007

### Details of associates

Significant associates comprise the following. The financial data shown is for the associate as a whole.

Name of entity	Principal activities	Interest Held by the Group			
		2008	2007		
HTS-110 Limited	Commercialisation of superconductor activity	49.76%	49.76%		
		\$000	\$000		
	Total assets	1,290	1,848		
	Total liabilities	(217)	(216)		
	Total revenue	2,480	2,181		
	Net profit/(loss)	(500)	(623)		
MPT-Matcor Pte Limited (company currently being divested)	Plant life cycle services in ASEAN region	50.00%	50.00%		
		\$000	\$000		
	Total assets	-	16		
	Total liabilities	-	(738)		
	Total revenue	-	139		
	Net profit / (loss)	-	(25)		
Name of entity	Principal activities	Group Carrying Value		Parent Carrying Value	
		2008 \$000	2007 \$000	2008 \$000	2007 \$000
HTS-110 Limited	Commercialisation of superconductor activity	563	812	3,807	-
MPT-Matcor Pte Limited	Plant life cycle services in ASEAN region	-	-	-	-
		<b>563</b>	<b>812</b>	<b>3,807</b>	<b>-</b>

All entities are incorporated in New Zealand with the exception of MPT-Matcor Pte Limited, which is incorporated in Singapore.

All entities have a balance date of 30 June. The directors are not aware of any significant events or transactions since balance date.

### Results of associates

	Group Carrying Value		Parent Carrying Value	
	2008 \$000	2007 \$000	2008 \$000	2007 \$000
Share of loss before income tax	(249)	(313)	-	-
Total recognised revenues and expenses	(249)	(313)	-	-

## Interests in associates

	GROUP		PARENT	
	2008 \$000	2007 \$000	2008 \$000	2007 \$000
Carrying amount at beginning of the year	812	628	-	364
Amortisation	-	-	-	(69)
Acquisition as the result of amalgamation of subsidiary	-	-	3,807	-
Share of total recognised revenues and expenses	(249)	(313)	-	-
Purchase of additional shares	-	497	-	(295)
	<b>563</b>	<b>812</b>	<b>3,807</b>	<b>-</b>

On 29 September 2006 the Parent's investment in HTS-110 Limited was sold to Innovation Finance Limited, a 100% Group subsidiary.

On 14 April 2008 Innovation Finance Limited was amalgamated with Industrial Research Limited and the investment in HTS-110 transferred to Industrial Research Limited.

## 14. OTHER FINANCIAL ASSETS

	GROUP		PARENT	
	2008 \$000	2007 \$000	2008 \$000	2007 \$000
Investment at fair value through profit and loss				
American Superconductor Limited	478	254	478	254
	<b>478</b>	<b>254</b>	<b>478</b>	<b>254</b>

## 15. JOINT VENTURE

The Group has a 50% participating interest in Superlink joint venture. The principal activity is high temperature superconducting intellectual property management. The joint venture partner is Meridian Energy Limited.

	GROUP	GROUP
	2008 \$000	2007 \$000
Share of revenue	10	23
Share of expenses	(15)	(37)
<b>SHARE OF NET DEFICIT</b>	<b>(5)</b>	<b>(14)</b>
Cash at bank	20	27
Trade receivables	8	4
Trade creditors	(5)	(3)
<b>NET ASSETS EMPLOYED IN THE JOINT VENTURE</b>	<b>23</b>	<b>28</b>

Superlink joint venture has the same balance date as the parent company.

## 16. BORROWINGS

	GROUP		PARENT	
	2008 \$000	2007 \$000	2008 \$000	2007 \$000
<b>Current portion</b>				
Capitalised finance lease obligations	250	569	250	569
Energy Efficiency and Conservation Authority	3	-	3	-
National Bank term advances facility	1,203	-	1,203	-
<b>TOTAL CURRENT BORROWING</b>	<b>1,456</b>	<b>569</b>	<b>1,456</b>	<b>569</b>
<b>Non-current portion – unsecured</b>				
Capitalised finance lease obligations	-	223	-	223
Energy Efficiency and Conservation Authority	9	-	9	-
National Bank term advances facility	-	11,650	-	11,650
<b>TOTAL NON-CURRENT BORROWING</b>	<b>9</b>	<b>11,873</b>	<b>9</b>	<b>11,873</b>

The carrying value of borrowing is equivalent to the fair value

The National Bank term advances facility is unsecured however Industrial Research Limited has undertaken a negative pledge agreement with the bank.

### TERM LIABILITY MATURITY PROFILE

	GROUP		PARENT	
	2008 \$000	2007 \$000	2008 \$000	2007 \$000
<b>Years of maturity</b>				
2007/2008	-	11,650	-	11,650
2008/2009	1,456	-	1,456	-
2009/2010	3	-	3	-
2010/2011	3	-	3	-
2011/2012	3	-	3	-
<b>TOTAL BORROWINGS</b>	<b>1,465</b>	<b>11,650</b>	<b>1,465</b>	<b>11,650</b>

	GROUP		PARENT	
	2008 \$000	2007 \$000	2008 \$000	2007 \$000

### Interest rates

#### Weighted average effective interest rates on borrowings (%)

Term advances facility	9.30%	8.61%	9.30%	8.61%
Capitalised finance lease obligations	9.82%	9.28%	9.82%	9.28%
Energy Efficiency and Conservation Authority	-	-	-	-

#### Gross finance lease obligations

No later than 1 year	255	566	255	566
Later than 1 year and no later than 5 years	-	257	-	257
Later than 5 years	-	-	-	-
	<b>255</b>	<b>823</b>	<b>255</b>	<b>823</b>
Future finance charges on finance leases	(5)	(60)	(5)	(60)

<b>Present value of finance lease liabilities</b>	<b>250</b>	<b>763</b>	<b>250</b>	<b>763</b>
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The present value of finance lease liabilities is as follows:

No later than 1 year	250	525	250	525
Later than 1 year and no later than 5 years	-	238	-	238
Later than 5 years	-	-	-	-
	<b>250</b>	<b>763</b>	<b>250</b>	<b>763</b>

## 17. EMPLOYEE BENEFITS ACCRUAL

	GROUP		PARENT	
	2008 \$000	2007 \$000	2008 \$000	2007 \$000
<b>Current</b>				
Employee entitlements	671	983	671	981
Long service and retiring leave	93	140	93	140
Annual leave	1,732	1,552	1,732	1,552
Sick leave	79	67	79	67
	<u>2,575</u>	<u>2,742</u>	<u>2,575</u>	<u>2,740</u>
<b>Non-current</b>				
Long service and retiring leave	568	616	568	616

## 18. INCOME IN ADVANCE

	GROUP		PARENT	
	2008 \$000	2007 \$000	2008 \$000	2007 \$000
Government and other income received in advance	1,051	1,311	1,051	1,311

Income received from government and other customers for project work not completed at 30 June.

## 19. DEFERRED TAX ASSET

	GROUP		PARENT	
	2008 \$000	2007 \$000	2008 \$000	2007 \$000
Balance at beginning of the year	-	2,700	-	2,700
Deferred portion of current period tax expense	-	(2,597)	-	(2,597)
Prior period adjustment	-	(103)	-	(103)
<b>Balance at end of period</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Deferred tax</b>				
Tax depreciation	669	822	669	822
Provisions and accruals	940	969	940	969
Other	936	855	936	855
Tax effect of unrecognised temporary differences	(2,545)	(2,646)	(2,545)	(2,646)
<b>Tax effect of unrecognised temporary differences</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Unrecognised tax losses</b>				
New Zealand	13,552	14,779	13,552	14,779
<b>Tax effect of unrecognised tax losses</b>				
New Zealand 30%	4,066	4,434	4,066	4,434
Effect of change in corporate tax rate from 33% to 30%	406	443	406	443
<b>Total</b>	<b>4,472</b>	<b>4,877</b>	<b>4,472</b>	<b>4,877</b>

Unrecognised income tax losses are available subject to the requirements of applicable tax legislation being met.

On 21 May 2007, income tax legislation was amended to change the corporate tax rate from 33% to 30% with effect from 1 April 2008.

The tax effects of unrecognised losses and timing differences have been adjusted to reflect this change.

## 20. INVENTORIES

	GROUP		PARENT	
	2008 \$000	2007 \$000	2008 \$000	2007 \$000
Raw materials and consumables	569	359	569	359
Work in progress	237	511	237	511
	<b>806</b>	<b>870</b>	<b>806</b>	<b>870</b>

## 21. TRADE AND OTHER PAYABLES

	GROUP		PARENT	
	2008 \$000	2007 \$000	2008 \$000	2007 \$000
<b>CURRENT PORTION</b>				
Trade creditors	1,813	1,279	1,813	1,279
Sundry creditors	319	448	313	446
Goods and services tax (GST) payable	145	249	145	249
Other payables and accruals	2,399	1,798	2,399	1,795
<b>Total trade and other payables</b>	<b>4,676</b>	<b>3,774</b>	<b>4,670</b>	<b>3,769</b>

Trade payables includes amounts due from related parties. See note 27 for details.  
The carrying amounts of the above items are equivalent to the fair values.

## 22. RECONCILIATION OF OPERATING SURPLUS WITH CASH FLOWS FROM OPERATING ACTIVITIES

	GROUP		PARENT	
	2008 \$000	2007 \$000	2008 \$000	2007 \$000
Reported surplus/(deficit) after tax	543	(5,710)	207	(3,104)
<i>Add/(less) non-cash items:</i>				
Depreciation	4,441	4,871	4,441	4,863
Amortisation of intangible assets	544	544	544	544
Impairment of property, plant and equipment	-	(409)	-	(409)
Revaluation of shares	(224)	(106)	(224)	(106)
Movement in taxation provision	-	2,700	-	2,700
Subsidiary/associate company investment writedown	-	-	-	143
Share of earnings retained by associates	249	313	-	-
Gain on disposal of subsidiary	-	-	-	(3,015)
Net current assets of business sold	-	(1,195)	-	(604)
Non-cash interest	-	-	643	748
(Surplus)/deficit on sale of plant and equipment	(8)	(1,060)	(8)	(1,062)
Movement in foreign exchange revaluation reserve	-	(12)	-	-
<i>Add/(less) movements in working capital:</i>				
Accounts receivable	(680)	3,312	(677)	2,688
Inventory	64	218	64	112
Trade creditors	433	(3,880)	435	(3,663)
<b>NET CASH FLOWS FROM OPERATING ACTIVITIES</b>	<b>5,362</b>	<b>(414)</b>	<b>5,425</b>	<b>(165)</b>

## 23. CRITICAL ACCOUNTING ESTIMATES AND JUDGEMENTS

Estimates and judgements are continually evaluated and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the circumstances

### Critical accounting estimates and assumptions

The Group makes estimates and assumptions concerning the future. The resulting accounting estimates will, by definition, seldom equal the related actual results. The estimates and assumptions that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are discussed below.

#### (a) Fair value of long service and retiring leave

The fair value of long service and retiring leave liability is determined by use of estimates of retiring age, probability of meeting retirement criteria and discounting future estimated payments. For the year ended 30 June 2007 the valuation of this liability was calculated by an actuary. The total liability calculated was \$756,000. For the year ended 30 June 2008 the liability was calculated internally using a discount cash flow model. The total liability at 30 June 2008 was \$661,000.

Adjusting the discount rate up/down by 1% results in an increase/decrease of the 2008 retiring/long service leave liability balance and hence end of year profit before tax of \$42,000.

#### (b) Fair value of derivatives and other financial instruments

The fair value of financial instruments is determined by valuations received from the Group's bankers. The valuations have been disclosed in the balance sheet and income statement for each year. The net impact of valuing these contracts at 30 June 2008 at a mark to market valuation was a net loss of \$7,000 (2007: \$nil).

Reliance is placed on the Group's banker to provide correct valuations for financial derivatives.

### Critical judgements in applying the entity's accounting policies

#### (a) Revenue recognition

The Group holds revenue in advance of \$1,051,000 (2007: \$1,311,000). A significant source of revenue for Industrial Research Limited is project based. Revenue is recognised on an accruals basis, which involves posting revenue to the income statement only when it is earned. Managers review projects and provide an assessment of project status. Based upon this assessment revenue in advance adjustments are made to the accounts.

Based upon this assessment total revenue in advance as a percentage of total income at 30 June 2008 was 1.8% of total revenue (2007: 2.4%).

## 24. FINANCIAL RISK MANAGEMENT

The Group's activities expose it to a variety of financial risks: market risk (including currency risk and interest rate risk), credit risk and liquidity risk.

The Group's overall risk management programme focuses on the unpredictability of financial markets and seeks to minimise potential adverse effects on the Group's financial performance. The Group uses derivative financial instruments to mitigate certain risk exposures.

Risk management is carried out by the finance group under policies approved by the Board of Directors. Finance identifies, evaluates and hedges financial risks in consultation with operational units. The Board provides written principles and advice for overall risk management, as well as written policies covering specific areas, such as foreign exchange risk, interest rate risk, credit risk, use of derivative financial instruments and non-derivative financial instruments, and investment of excess liquidity.

(a) Market risk

Foreign exchange risk

The Group operates internationally and is exposed to foreign exchange risk arising from various currency exposure, primarily with respect to the US dollar and Australian dollar. Foreign exchange risk arises from future commercial transactions and recognised assets and liabilities.

To manage their foreign exchange risk arising from future commercial transactions and recognised assets and liabilities, the Group use forward contracts transacted through Group finance. Foreign exchange risk arises when future commercial transactions or recognised assets and liabilities are denominated in a currency that is not the entity's functional currency.

Group finance treasury policy is to take forward cover between 75% and 100% of anticipated cash flows (mainly overseas revenue receipts and purchase of materials). A process of natural hedge and forward cover contracts are used to hedge foreign currency risk. Between 60% and 70% of foreign currency receipts are used to purchase goods payable in foreign currency. Forward cover contracts are utilised to repatriate remaining foreign currency balances.

At 30 June 2008, if the \$NZD had weakened/strengthened by 10% against the US dollar with all other variables held constant, post-tax profit for the year would have been: strengthened \$42,000 loss, weakened \$52,000 profit (2007: strengthened \$61,000 loss, weakened \$74,000 profit) as the result of foreign exchange gains/losses on translation of US dollar denominated trade receivables/payables.

At 30 June 2008, if the \$NZD had weakened/strengthened by 10% against the Australian dollar with all other variables held constant, post tax profit for the year would have been, strengthened \$22,000 loss, weakened \$27,000 profit (2007: strengthened \$9,000 loss, weakened \$11,000 profit,) as the result of foreign exchange gains/losses on translation of Australian dollar denominated trade receivables.

	\$000 Loans and Receivables	\$000 Fair value through income statement	\$000 Available for sale
<b>Financial instruments by category</b>			
<b>As at June 2008</b>			
Cash and cash equivalents	98	-	-
Trade and other receivables	4,551	-	-
Publicly traded investments	-	-	478
	<b>4,649</b>	<b>-</b>	<b>478</b>
<b>Liabilities</b>			
Borrowings	1,468	-	-
Derivative financial instruments	-	7	-
	<b>1,468</b>	<b>7</b>	<b>-</b>
<b>As at June 2007</b>			
<b>Assets</b>			
Cash and cash equivalents	738	-	-
Trade and other receivables	3,869	-	-
Publicly traded investments	-	-	254
	<b>4,607</b>	<b>-</b>	<b>254</b>
<b>Liabilities</b>			
Borrowings	12,442	-	-
Derivative financial instruments	-	-	-
	<b>12,442</b>	<b>-</b>	<b>-</b>

## Interest rate risk

As the Group has no significant interest-bearing assets, the Group's income and operating cash flows are substantially independent of changes in market interest rates.

The Group's interest rate risk arises from term borrowings. Borrowing issued at variable rates exposes the Group to cash flow interest rate risk. Borrowings issued at fixed rates expose the Group to fair value interest rate risk. Group policy is to maintain at least 30% of its borrowings in fixed rate instruments.

During the 2007 and 2008 year the Group's borrowings were denominated in New Zealand dollars.

The Group analyses its interest rate exposure on a periodic basis. Based on these periodic analysis the impact on post-tax profit of a 0.1% shift would be a maximum increase/decrease of \$7,000 (2007: \$12,000).

The Group uses fixed rate debt to minimise its exposure to fluctuating interest rates.

As at balance date the Group had not used interest rate swaps to hedge interest rate risk.

## Credit risk

Financial instruments which potentially subject Industrial Research Limited and the Group to credit risk principally consist of cash and cash equivalents, trade and other receivables, and interest rate swaps and options.

Credit risk is minimised as a result of several key controls:

- maintaining maximum limits for each broad class of counterparty and individual counterparties
- limiting investments to organisations with a long-term Standard & Poor's credit rating of AA- or better
- controlling the level and spread of trade and other receivables outstanding.

As a result of these controls there are no significant concentrations of credit risk.

The table below shows the credit limit and balance of the one major counterparty at the balance sheet date.

	30 June 2008		30 June 2007	
	Credit Limit	Balance	Credit Limit	Balance
	\$000	\$000	\$000	\$000
National Bank of New Zealand	15,100	1,203	15,000	11,650

## Liquidity risk

Liquidity risk is the risk that Industrial Research Limited cannot meet its financial obligations in full.

Prudent liquidity risk management implies maintaining sufficient cash, the availability of funding through an adequate amount of committed credit facilities and the ability to close out market positions. Due to the dynamic nature of the underlying businesses, Group finance maintains flexibility in funding by maintaining availability under committed credit lines.

The table below analyses the Group's financial liabilities and net settled derivative financial liabilities into relevant maturity groupings based on the remaining period at the balance sheet to the contractual maturity date. The amounts disclosed in the table are the contractual undiscounted cashflows. Balances due within 12 months equal their carrying balances as the impact of discounting is not significant.

	Less than 1 year \$000	Between 1-2 years \$000	Between 2-5 years \$000	Over 5 years \$000
<b>At 30 June 2008</b>				
Cash	98	-	-	-
Trade and other receivables	4,201	-	-	-
Borrowings	(1,206)	(3)	(6)	-
Finance lease	(250)	-	-	-
Derivative financial instruments	(7)	-	-	-
Trade and other payables	(4,676)	-	-	-

	Less than 1 Year \$000	Between 1-2 Years \$000	Between 2-5 Years \$000	Over 5 Years \$000
<b>At 30 June 2007</b>				
Cash	738	-	-	-
Trade and other receivables	3,519	-	-	-
Borrowings	-	(11,873)	-	-
Finance lease	(319)	(250)	-	-
Derivative financial instruments	-	-	-	-
Trade and other payables	(3,774)	-	-	-

The table below analyses the Group's derivative financial instruments which will be settled on a gross basis into relevant maturity groupings based on the remaining period at the balance sheet to the contractual maturity date. The amounts disclosed in the table are the contractual undiscounted cash flows. Balances due within 12 months equal their carrying balances as the impact of discounting is not significant

	Less than 1 Year \$000	Between 1-2 Years \$000	Between 2-5 Years \$000	Over 5 Years \$000
<b>At 30 June 2008</b>				
Forward foreign exchange contracts - cash flow hedges				
Outflow	-	-	-	-
Inflow	522	-	-	-

	Less than 1 Year \$000	Between 1-2 Years \$000	Between 2-5 Years \$000	Over 5 Years \$000
<b>At 30 June 2007</b>				
Forward foreign exchange contracts - cash flow hedges				
Outflow	-	-	-	-
Inflow	-	-	-	-

The Group holds no forward foreign exchange contracts held for trading purposes.

## 25. CAPITAL RISK MANAGEMENT

The Group's capital includes share capital, reserves and retained earnings.

The Group's objectives when managing capital are to safeguard the Group's ability to continue as a going concern in order to provide returns for shareholders and benefits for other stakeholders and to maintain an optimal capital structure to reduce the cost of capital.

In order to maintain or adjust the capital structure, the Group may adjust the amount of dividends paid to shareholders, return capital to shareholders, issue new shares or sell assets to reduce debt.

Consistent with others in the industry, the Group monitors capital on the basis of the gearing ratio. The ratio is calculated as net debt divided by total capital.

Net debt is calculated as total borrowings (including "current and non-current" borrowings as shown in the consolidated balance sheet) less cash and cash equivalents. Total capital is calculated as "equity" as shown in the consolidated balance sheet plus net debt.

The Group is not subject to externally imposed capital requirements and there has been no material change in management of capital in the year.

During 2008 the Group's strategy was to maintain the gearing ratio below 45%. The gearing ratios at 30 June 2008 and 2007 were as follows:

	GROUP	
	2008	2007
Total borrowings	1,465	12,442
Less: cash and cash equivalents	(98)	(738)
Net debt	1,367	11,704
Total equity	28,583	19,700
Total debt and equity	29,950	31,464
Gearing ratio	5%	37%

The decrease in the gearing ratio during 2008 resulted primarily from the issue of share capital.

## 26. OTHER EXPENSES

### Severance payments

Severance payments include any consideration (monetary or non-monetary) provided to any employee in respect of the employee's agreement to the termination of their employment with Industrial Research Limited.

	GROUP		PARENT	
	2008 \$000	2007 \$000	2008 \$000	2007 \$000
Severance payments	143	2,068	143	2,068
Number of employees	2	25	2	25

## 27. RELATED PARTIES DISCLOSURES

	GROUP		PARENT	
	2008 \$000	2007 \$000	2008 \$000	2007 \$000

### KEY MANAGEMENT PERSONNEL COSTS

Salary and other short-term benefits (including severance payments where applicable)	1,030	1,971	1,030	1,971
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The table above includes the remuneration of the Chief Executive and members of the executive management team.

### General

The Government of New Zealand is 100% shareholder in Industrial Research Limited. All transactions with other state-owned enterprises and government departments and agencies are at arm's length, and are not considered to fall within the intended scope of disclosure of related party transactions.

There were no significant related party transactions during the year other than those disclosed in these financial statements. No related party debts have been written off or forgiven during the year.

All members of the Group are considered to be related parties of Industrial Research Limited. This includes the subsidiaries identified in note 12, the associated entities in note 13 and the joint venture identified in note 15.

	PARENT	
	2008 \$000	2007 \$000

**Related party transactions**

Industrial Research Limited is the parent company of a number of subsidiary companies.

Transactions during the period were:

Sales of services and general recoveries	-	78
Interest paid	643	748

**Other related parties:**

	PARENT	
	2008 \$000	2007 \$000

Details on the loans from subsidiaries at balance date were:

Innovation Finance Limited	-	9,209
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With entities associated with directors or entities associated with directors' close family members

Transactions during the period were:

Sales of services and general recoveries	794	1,078
Purchase of services	1,110	1,230

Goods are sold based on arm's length prices and terms that would be available to third parties.

Goods and services are purchased from other related parties on normal commercial terms and conditions.

**Sales:**

Director	Related Party	Relationship	PARENT	
			2008 \$	2007 \$
Brian Rhoades	Institute of Geological and Nuclear Sciences Limited	Brother is an employee	110,895	193,609
Ian Parton	VT Fitzroy Limited	Chairman/director	18,450	12,831
Ian Parton	HTS-110 Limited	Chairman/director	660,537	866,914
Ian Parton	Watercare Services Limited	Director	4,280	4,396
Amounts due from Institute of Geological and Nuclear Sciences Limited			9,569	9,705
Amounts due from Watercare Services Limited			-	45

**Purchases:**

Director	Related Party	Relationship	PARENT	
			2008 \$	2007 \$
Brian Rhoades	Institute of Geological and Nuclear Sciences Limited	Brother is an employee	45,749	48,522
Ian Parton	VT Fitzroy Limited	Chairman/director	528	560
Ian Parton	HTS-110 Limited	Chairman/director	1,053,457	1,162,812
Maxine Simmons	Bio Catalyst Limited	Director	-	13,780
Maxine Simmons	NZBio	Member	10,422	3,841
Amounts owed to Institute of Geological and Nuclear Sciences Limited			-	13,493

## Transactions with associate companies

	PARENT	
	2008 \$000	2007 \$000
Industrial Research Limited is a 49.76% shareholder in HTS-110 Limited. All transactions with HTS-110 Limited are at arm's length.		
Sales of services and general recoveries	661	867
Purchase of services	1,053	1,230
Amounts owed to HTS-110 Limited	-	54
Amounts due from HTS-110 Limited	81	56

## 28. COMMITMENTS AND CONTINGENCIES

### CAPITAL COMMITMENTS

	GROUP		PARENT	
	2008	2007	2008	2007
	\$000	\$000	\$000	\$000

Commitments for capital expenditure contracted, but not provided for:

<b>TOTAL CAPITAL COMMITMENTS</b>	<b>2,481</b>	<b>584</b>	<b>2,481</b>	<b>584</b>
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### OPERATING COMMITMENTS

Commitments for non-cancellable operating leases and other operating commitments:

Not later than one year	1,847	2,441	1,847	2,441
Later than one year and not later than five years	4,134	4,821	4,134	4,821
Later than five years	438	-	438	-
<b>TOTAL OPERATING COMMITMENTS</b>	<b>6,419</b>	<b>7,262</b>	<b>6,419</b>	<b>7,262</b>

Leased assets comprise computer hardware, computer software, office equipment and property leases.

### CONTINGENCIES

There were no known contingent liabilities at balance date (2007: \$1,002,735).

## 29. SEGMENT REPORTING

The entity operates in New Zealand and is an innovation company with science as its core strength. More than 90% of the Group's total operating revenues, operating earnings and identifiable assets are generated by operations in New Zealand. Therefore there is no requirement for segment reporting. The group has not early adopted IFRS 8, Operating Segments. Please refer to note 1 on early adoption of standards.

## 30. EVENTS AFTER THE BALANCE SHEET DATE

There were no significant events after balance date.

# Board responsibility statement

The Board of Industrial Research Limited has the responsibility for:

- (a) The preparation of the annual financial statements and the judgments used therein.
- (b) Establishing and maintaining a system of internal control designed to provide reasonable assurance as to the integrity and reliability of financial reporting.

In the opinion of the management, the annual financial statements for the financial year ended 30 June 2008 fairly reflect the financial position and operations of Industrial Research Limited. This statement is issued in accordance with section 155 Crown Entities Act 2004.

The annual report and the financial statements presented on pages 60 to 97 are signed for and on behalf of the Board and were authorised for issue on the date set out below.



**B Rhoades** / Chariman



**I Parton** / Director

Date: 5 September 2008



## Directory

### Board of Directors

Michael Ahie, Wellington

David Henry, Auckland

Anita Mazzoleni, Auckland

Ian Parton, Auckland

Brian Rhoades, Nelson  
Chairman

Maxine Simmons, Auckland

Craig Stobo, Auckland  
Deputy Chairman

Secretary, Jeff Lycett

### Executive Management

Chief Executive  
Shaun Coffey

#### GM Science and Technology

George McMeel  
*(until 23 November 2007)*  
Barry Marlow  
*(from 4 January 2008)*

#### GM Commercialisation and Business Development

Wynn Ingram  
*(until December 31 2007)*  
Suki Siriwardena  
*(from 28 January 2008)*

#### GM Corporate Services

George McIrvine

Executive Officer  
Jeff Lycett

### Registered Office

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PO Box 31-310  
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New Zealand  
Phone +64 4 931 3000  
Fax +64 4 566 6004

### Auckland

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24 Balfour Road, Parnell  
PO Box 2225  
Shortland Street  
Auckland 1140  
New Zealand  
Phone +64 9 920 3100  
Fax +64 9 307 0618

### Christchurch

5 Sheffield Crescent  
Bishopdale  
PO Box 20-028  
Christchurch 8543  
Phone +64 3 358 9189  
Fax +64 3 358 9506

### Associate Company

HTS-110 Limited  
Chief Executive  
Sohail Choudhry  
*(until 15 October 2007)*  
Donald Pooke  
*(from 1 February 2008)*  
[www.hts-110.com](http://www.hts-110.com)

### Joint Venture Company

General Cable  
Superconductors Limited  
CEO (Acting)  
Aaron Gilmore

### Auditors

PricewaterhouseCoopers  
113-119 The Terrace  
P O Box 243  
Wellington 6140  
On behalf of the Controller  
and Auditor-General

### Solicitors

Russell McVeagh  
48 Shortland Street  
P O Box 8  
Auckland 1140

### Patent Attorneys

AJ Park  
Huddart Parker Building  
1 Post Office Square, 6011  
P O Box 949  
Wellington 6140

Baldwins  
342 Lambton Quay, 6011  
P O Box 852  
Wellington 6140

### Bankers

The National Bank of New Zealand  
1 Victoria Street  
P O Box 540  
Wellington 6011

### Website

[www.irl.cri.nz](http://www.irl.cri.nz)

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