

NEW ZEALAND ALUMINIUM SMELTERS LIMITED



2010 SUSTAINABLE DEVELOPMENT REPORT



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# 2010 NZAS Sustainable Development Report

Once again I am pleased to introduce the annual Sustainable Development Report for New Zealand Aluminium Smelters Limited (NZAS). This document outlines NZAS' achievements during 2010 and plans for 2011.

2010, although challenging at times, has been another very successful year for NZAS.

The smelter achieved two record safety milestones in September, achieving record safe days, as well as surpassing one million hours safe on the NZAS site.

Aluminium production increased from 271,902 tonnes in 2009 to 343,335 tonnes in 2010, with 137,619 tonnes of high purity metal produced during the year.

The new transformer to replace the Reduction Line 2 transformer arrived on site in May and was successfully energised in June. This was a significant milestone for NZAS in our progress towards full security of supply. The second new transformer is scheduled to arrive in June 2011.

The restart of Reduction Line 1 following the transformer failure was carried out safely without serious incident or injury. This outcome would not have been possible without the dedication of everyone involved.

In August, NZAS achieved a plant record, surpassing the 610 megawatt level for power consumption. This should position us for a record production year in 2011.

Settlement was reached with Meridian Energy in October following the dispute

around NZAS' Take or Pay electricity contract following the unexpected transformer failure in November 2008.

NZAS was the first aluminium smelter in the world to be exposed to a carbon cost for its site emissions and indirect emissions when the Emissions Trading Scheme came into force in New Zealand on 1 July 2010.

One environmental incident was recorded. The category 3 incident was a pitch spill into the sea from the Tiwai wharf during ship unloading operations. A full investigation was undertaken and improvements to the system were implemented to prevent a similar occurrence.

During the year, NZ\$18.7 million was delivered through Lean Six Sigma initiatives. The focus for 2011 is to improve the implementation of these tools.

NZAS invested NZ\$41.3 million into infrastructure improvement projects. This will increase to NZ\$50.4 million for 2011 and demonstrates that NZAS is an important part of the Rio Tinto assets going forward.

The Spent Cell Lining (SCL) crushing plant was commissioned during the year. NZAS has contracts in place with overseas and domestic customers to recycle the SCL. The first shipment was exported to Europe in October.

Rio Tinto Alcan launched 'Bravo!', a global employee recognition programme in 2010 as a way to recognise and celebrate the valuable contributions made by employees. A number of NZAS employees were recognised during the year.

NZAS was awarded the Corporate Conservation Award at the 2010 Department of Conservation's Southland Conservation Awards for its involvement with Kakapo Recovery. A new Kakapo Partnership Agreement to the value of NZ\$1 million over five years was signed in January 2011.

Our largest community donation in 2010 was NZ\$250,000 to the Christchurch Earthquake Appeal. Tragically, an even more devastating earthquake struck the area in February 2011, resulting in 181 people losing their lives. An additional NZ\$500,000 donation was made by NZAS. Site expertise was also offered to the local authorities to assist in the recovery process.

2011 will be a very special year for NZAS as a number of commemorations will take place to celebrate the smelter's 40th anniversary.

**Ryan Cavanagh**  
General Manager  
New Zealand Aluminium Smelters Limited



*Each year we produce our Sustainable Development Report to inform our stakeholders about our business activities. It is important to us to provide useful and relevant information. I invite you to please take a moment to complete the feedback form included with this report. Your comments will help us tailor future editions of this report to meet your information needs.*

*NZAS owns and operates New Zealand's only aluminium smelter at Tiwai Point, near Bluff. It is a joint venture company owned by Rio Tinto Alcan (79.36 per cent) and Sumitomo Chemical Company Limited of Japan (20.64 per cent).*

# Health And Safety

NZAS recognises that excellence in safety performance comes from having strong leadership, consistent standards, equipment in good operational condition, and the involvement and commitment of all employees and contractors. NZAS has a fundamental belief that all injuries and incidents are preventable – ‘our goal is zero’.

	2010 Plan	2010 Actual
All injuries	7	3
All Injury Frequency Rate (AIFR)	0.76	0.31
Recordable occupational illnesses	4	2

Two occupational illnesses were recorded in 2010. One related to occupational stress and the other was musculoskeletal (tennis elbow).

## Plans for Health in 2011:

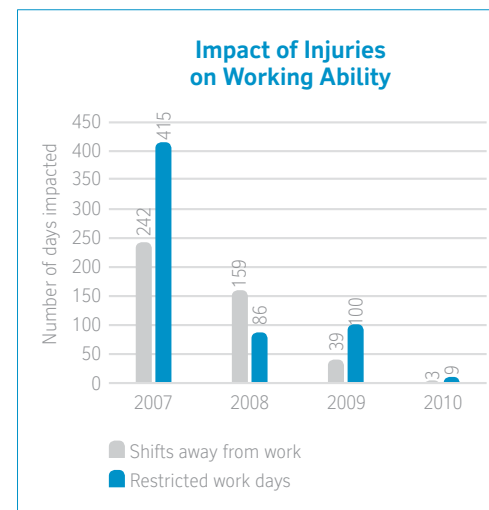
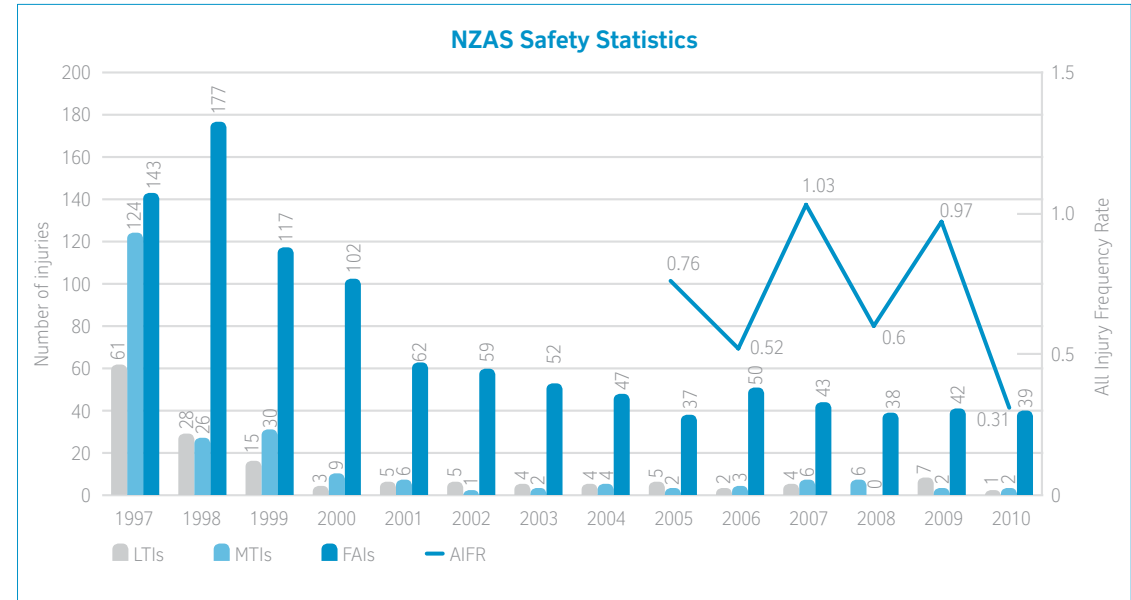
- Further education for employees on health and on prevention of occupational illnesses through Safe Days meetings
- Implementation of ‘Return to Work’ programme, which includes regular review meetings to prevent aggravation of injury or illness
- Focus on identification of top manual handling risks and reviewing options to reduce risk of injury and illness
- Continue noise reduction programme with advice from acoustic engineer
- Action plans will be developed to reduce dust and fume levels on site

## Plans for Safety in 2011:

- Develop a Strategic Safety Plan which will assist NZAS in the journey to zero and interdependence
- Change Safety Observation process to target tasks identified by teams
- Improve data capture and analysis on Near Hits (a Near Hit is defined as an opportunity to improve safety, based on modifying behaviour or changing conditions with potential for more serious consequences)
- Introduction of new behavioural analysis process
- Continue to embed Zero Incident Process (ZIP) to drive safety performance with cognitive thinking at the forefront in understanding what drives behaviours and attitudes

BLUFF COMMUNITY BOARD CHAIRPERSON, JAN MITCHELL – FOLLOWING BOARD VISIT:

“The presentation you made outlining the process employed in the lead up to zero on-site injuries was very interesting to us. What you have achieved in this area and what you aim to achieve in the future is a tremendous example of ‘Best Practice’ and should be utilised by other businesses.”



## Safety definitions

### Lost Time Injury (LTI) and Restricted Work Days (RWD)

An LTI/RWD occurs when a person, as a result of injury, is unable to attend their next working shift, or is unable to fulfil the requirements of their role

### Medical Treatment Case (MTC)

A MTC is an injury or occupational illness which is not classified as lost time, but which results in referral for medical treatment other than first aid

### First Aid Injury (FAI)

A FAI is limited to a one time treatment and subsequent observation and involves treatment for only minor injuries not emergency treatment of serious injuries

### All Injury Frequency Rate (AIFR)

Rate of occurrence of all recordable injuries (LTIs and MTCs) per 200,000 hours worked

## CASE STUDY 1



Ryan Cavanagh (NZAS General Manager) presenting sunscreen to Alison Cook (Principal) and students from Bluff Community School

## Record safe days achieved in 2010

In September 2010, NZAS reached two significant safety milestones – achieving record safe days, as well as surpassing one million hours safe on the NZAS site.

NZAS General Manager, Ryan Cavanagh said, “Safety is absolutely paramount at the smelter and I am very proud of the NZAS team for making the right safety choices each day in every task that we do.”

“The fundamental belief of our safety culture is that we keep ourselves safe so that we can enjoy the things in life we love – our ‘Personal Big 5’. Half a day of annual leave

in recognition of record safety performance rewarded our employees and contractors with time to enjoy their Personal Big 5,” he said.

To celebrate this milestone locally, the smelter provided sunscreen and wall-mounted stands for every classroom in all 32 Invercargill and Bluff primary schools. Each school also received a number of additional bottles of sunscreen. The community donation amounted to over NZ\$25,000.

NZAS also worked with the Cancer Society to recommend the schools consider becoming Sunsmart accredited. This initiative reflects the

smelter’s vision of ‘zero harm by choice’ and occurred just in time for the start of summer.

**SIMON – ROOM 2, WOODLANDS FULL PRIMARY SCHOOL:**  
“Thank you for the sunscreen and wall mounted stands. They will come in handy. Your time without a big injury is a very long time and I would not be able to last 1,000,000 hours without a big injury. Thanks again for the sunscreen and wall mounted stand.”

## CASE STUDY 2

### Prevention of occupational dermatitis

NZAS implemented a programme in 2010 to raise awareness of skin conditions and how to prevent Occupational Dermatitis. Early intervention and use of preventative measures are essential to prevent skin conditions.

The presentation delivered to crews in early 2010, covered the importance of early reporting of skin irritations and promoted the regular use of skin conditioners after work. Two products were trialled – Stokoderm as a pre-work cream and Stokolan as an after-work moisturising lotion. Product dispensers were provided in the washrooms.

Education and product use was successful with employees using skin products, resulting in improved hand condition.



# People Commitment

## 2010 Employment facts

Number of permanent Full Time Equivalent (FTE) Employees	741
Number of FTE contractors	170.2
Employee turnover	5.1%
Diversity	93.3% males, 6.7% females
Wages and benefits paid	NZ\$86.2 million

Employee turnover remained relatively stable. In the latter half of 2010, graduate recruitment was completed and eight new graduates in engineering and other fields appointed. Two of the graduates commenced in late 2010 with the remaining six commencing in January 2011.

## Rio Tinto Global Employee Engagement Survey

Another Rio Tinto wide Global Employee Engagement Survey was completed by employees in July 2010. The results were presented to NZAS employees in November by their leaders. The survey provided NZAS with an opportunity to measure how successful it had been in improving performance in areas previously identified for improvement, and also other areas where there was opportunity to improve. Additionally, building on positive areas was also important.

Based on the survey results, areas for NZAS to focus on in 2011 include Personal Performance & Recognition, Personal and

Career Development, and Rewards and Benefits. Focus groups will be held with employees to address these issues.

During 2010, there was ongoing education to ensure that employees understood the basis of their salary and bonus (Short Term Incentive Plan – STIP) calculations. This work will continue into 2011. Other components of the Integrated Talent Management System (ITMS) development and succession planning and talent management areas also offer opportunities for employees and the business going forward.

The new Rio Tinto Alcan employee recognition scheme 'Bravo!' was implemented during 2010 and built on existing NZAS recognition systems. A number of NZAS employees and teams have achieved recognition with Bravo! (see case study).

### Plans for People Commitment in 2011:

- Focus on graduate recruitment (sourcing and development)
- Continue work on talent management and succession planning with emphasis on the quality of development plans and career development

- Implement changes relating to Holiday Act legislation
- Further embed the updated performance management and recognition system (ITMS)
- Implement and communicate improvements from the Rio Tinto Global Employee Engagement Survey
- Continue the leadership development training programme to support front line leaders



Dwane Copeland (left) and Phil Jones pictured with Xiaoling Liu, President, Rio Tinto Alcan Primary Metal Pacific

## New employee recognition programme

In 2010, Rio Tinto Alcan launched a global employee recognition programme as a way to recognise and celebrate Rio Tinto Alcan teams' meaningful contributions. Bravo! was designed on feedback received from the 2008 Rio Tinto Global Employee Engagement survey.

All Rio Tinto Alcan employees are able to nominate a colleague or a team for a Bravo! award, and are also eligible to receive an award. The nomination categories are based on several key factors that are important to the business – our values, business priorities, leadership and community involvement.

Launched at Rio Tinto Alcan Primary Metal Pacific (PMP) in March, a special Business Unit

Bravo! Award was presented to Phil Jones (Plant Services) and Dwane Copeland (Reduction Maintenance). They were recognised for their outstanding work in developing a torbed cone valve support to reduce ergonomic and working at height hazards for employees conducting maintenance work in the torbed reactors (dry scrubbers).

Xiaoling Liu, President, Primary Metal Pacific, said, "I commend Phil and Dwane for their strong commitment to safety improvement by researching and developing an innovative solution to a safety hazard – which goes beyond their day to day duties."

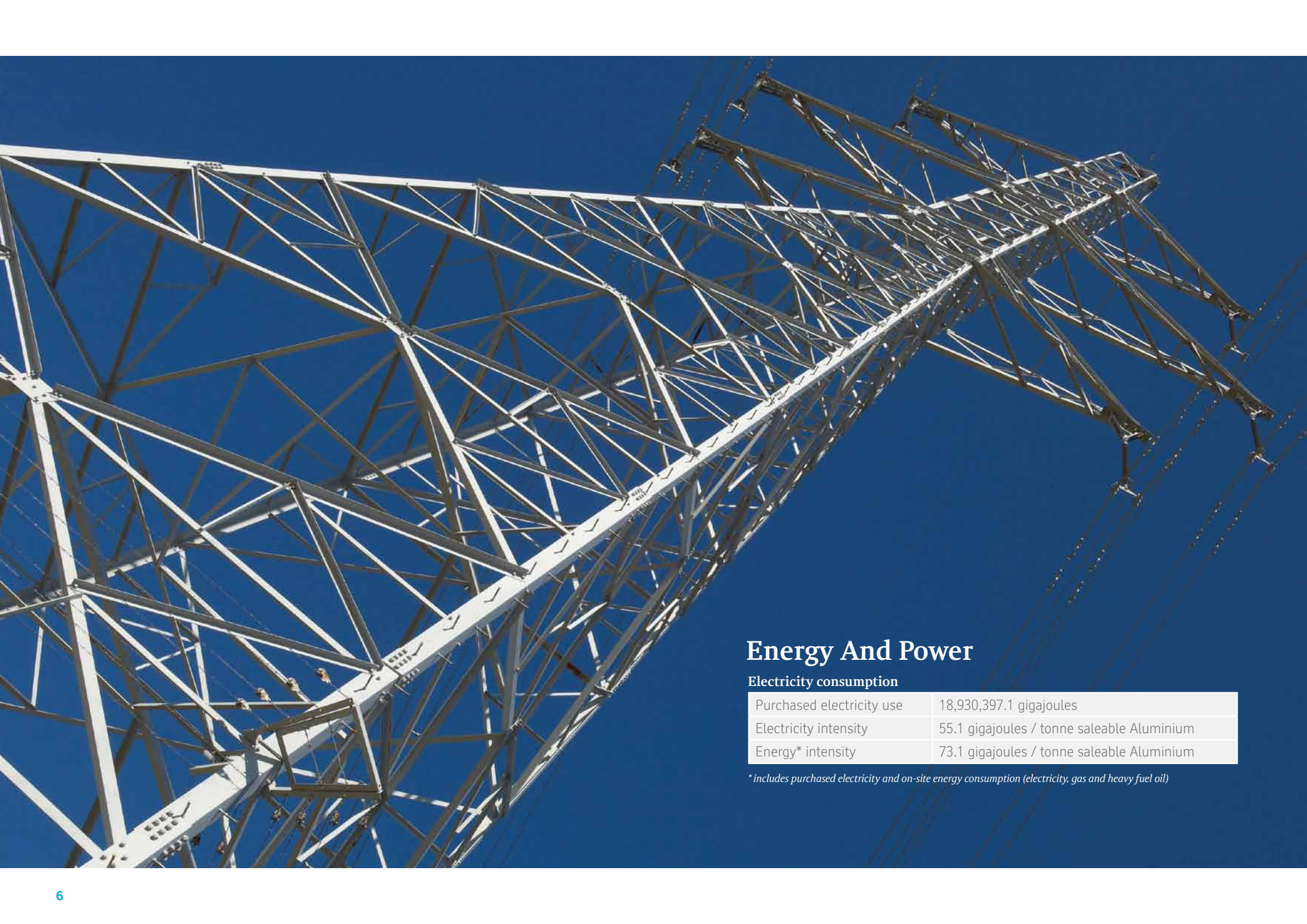
The first NZAS site Bravo! Award winners were announced in October 2010:

- **Our Values Award** – Rodding Room, for their significant contribution towards operational improvements through the 80-20 project
- **Business Priorities Award** – Reduction South, for their outstanding response to the loss of Line 1 and the subsequent restart
- **Leadership Award** – Metal Products VDC1 Kaizen Team, for their valuable contribution towards VDC1 block saw improvements

- **Community Involvement Award** – John Brown (Plant Services), for his many years of voluntary involvement with the Blue Light Programme

The winner of each category was awarded a Bravo! trophy, certificate and a morning tea for their crew, as well as being nominated for the Primary Metal Pacific Bravo! Awards.

The VDC1 Kaizen Team was awarded the PMP Leadership Bravo! Award at an awards ceremony held in Brisbane in December (further information on the VDC1 Kaizen Team award can be found in the Operational Excellence section of this report).



## Energy And Power

### Electricity consumption

Purchased electricity use	18,930,397.1 gigajoules
Electricity intensity	55.1 gigajoules / tonne saleable Aluminium
Energy* intensity	73.1 gigajoules / tonne saleable Aluminium

*\* includes purchased electricity and on-site energy consumption (electricity, gas and heavy fuel oil)*

# Financial Strength

## 2010 Payments to suppliers\*

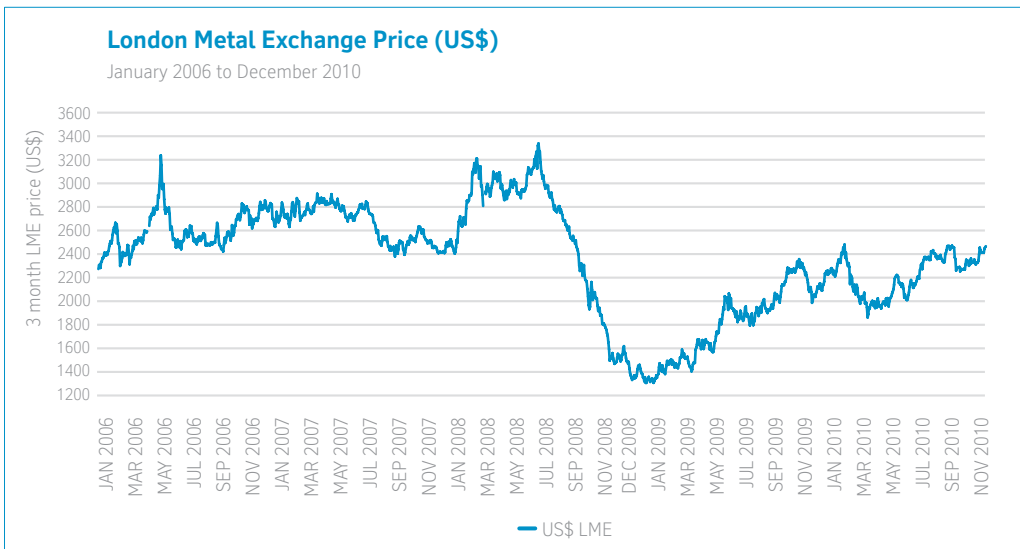
Local	NZ\$59 million
National	NZ\$682 million

## Economic contribution

According to the 2004 Brown Copeland report, the annual average net economic contribution from NZAS to New Zealand was calculated at NZ\$121 million. Venture Southland conducted an economic and social impacts study of NZAS on the Southland economy in 2009.

GDP benefit to Southland region	NZ\$506 million
Export receipts	NZ\$1 billion approximately

\*Operational costs only, excludes capital programme



This graph shows the London Metal Exchange (LME) price of aluminium in US dollars

## CASE STUDY 1

### NZAS capital programme

In 2010, NZAS invested NZ\$41.3 million into infrastructure improvement projects and this amount is planned to increase to NZ\$50.4 million for 2011. This significant capital investment by NZAS shareholders, Rio Tinto Alcan and Sumitomo Chemical Company will ensure the smelter is well placed for the future.

The major projects planned for 2011 are:

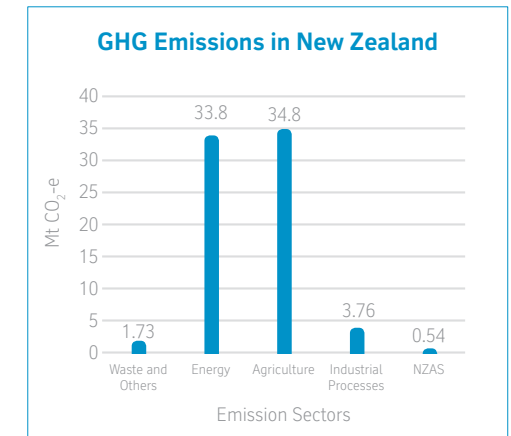
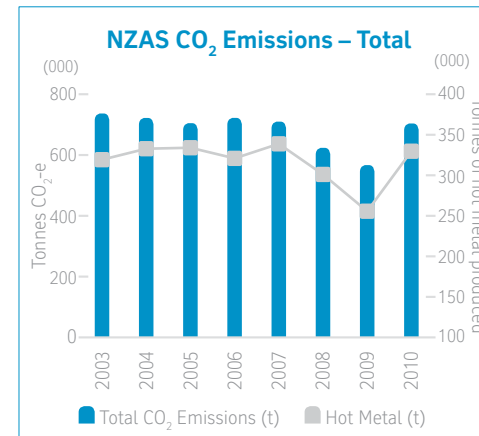
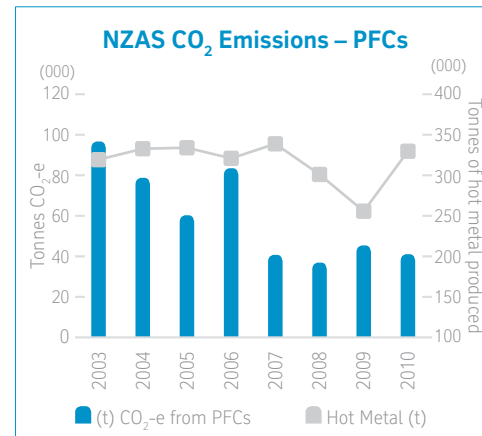
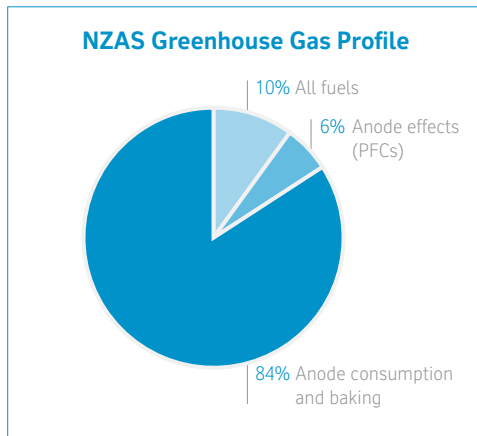
- NZ\$10.8 million - ship unloader replacement project to continue
- NZ\$7.8 million - replacement of two Carbon bake furnace cranes
- NZ\$6.5 million - billet casting upgrade
- NZ\$6.0 million - Carbon bake furnace rebuild (phase 1 of an NZ\$18 million project that will be completed over the next three years)
- NZ\$4.5 million - switchyard transformer upgrade

### NZAS capital programme



# Greenhouse and Energy Efficiency

Greenhouse gases are emitted during the production of aluminium from three major sources: consumption of carbon anodes, production of perfluorocarbons (PFC) and consumption of fuels, mostly heavy fuel oil.



## Greenhouse gas emissions from carbon anode consumption

Emission of greenhouse gases during the production of aluminium is unavoidable as the consumption of carbon anode blocks forms part of the chemical process to produce aluminium. However, greenhouse gas emissions can be minimised by manufacturing high quality anodes. NZAS applies significant effort and resources to ensure the production of quality carbon anodes that minimise greenhouse gas production.

'Airburn' is the term given to the undesirable process by which anodes are consumed when they are in contact with air. Anodes consumed in this way release greenhouse gases but do not yield any aluminium production. In late 2010, a team of NZAS employees was engaged to research the cause and effect of airburn. This team has been very successful and airburn at NZAS has been significantly reduced. A 90 per cent reduction in the

number of anodes that had to be removed from the production process early due to airburn has been achieved.

## Greenhouse gas emissions from perfluorocarbons

Perfluorocarbons (PFC) are gases emitted from the aluminium production process when conditions in the production cells become unstable. PFCs contribute to climate change in the same way that CO<sub>2</sub> does.

Until 2006, PFC emissions were relatively high and improved control of PFC emissions was implemented in 2007. Large spikes have not been seen since 2006 despite experiencing instability during 2009 following the Reduction Line 1 shutdown. Further improvements can potentially be made to PFC emissions, as these can be theoretically eliminated. Currently PFCs account for six per cent of the total greenhouse gas emissions for NZAS. Only four years ago this number was 12 per cent.

## Total greenhouse gas emissions

The graph shows the annual tonnes of greenhouse gas emitted since 2003. The lower emissions in 2008 and 2009 were as a result of the shutdown of Reduction Line 1 following a transformer failure. In 2010, aluminium production returned to normal levels.

Since 1990, NZAS has reduced its CO<sub>2</sub>-e emissions by 40 per cent and increased aluminium production by 30 per cent.

## NZAS greenhouse gas emissions in context

To put NZAS emissions into perspective, the total amount of greenhouse gas emitted by all sectors in New Zealand in 2008 was 74.7 million tonnes (Mt) CO<sub>2</sub> equivalent. Of this total, NZAS emitted 0.54 Mt or 0.7 per cent.

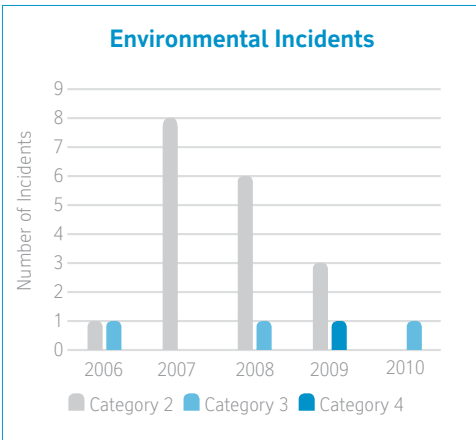
## Emissions Trading Scheme introduced

Following the introduction of the New Zealand Emissions Trading Scheme on 1 July 2010, NZAS was the first aluminium smelter in the world to be exposed to a carbon cost for both its on-site emissions and indirect emissions.

All major industries including NZAS, are required to acquire permits for every tonne of CO<sub>2</sub> equivalent (CO<sub>2</sub>-e) emissions.

This cost has to be absorbed by NZAS and cannot be passed on to its customers as the price of aluminium is set by the London Metal Exchange, not by NZAS itself.





#### Environmental incident definitions

##### Category 2 – Medium

Near source confined and short term reversible impact

##### Category 3 – Serious

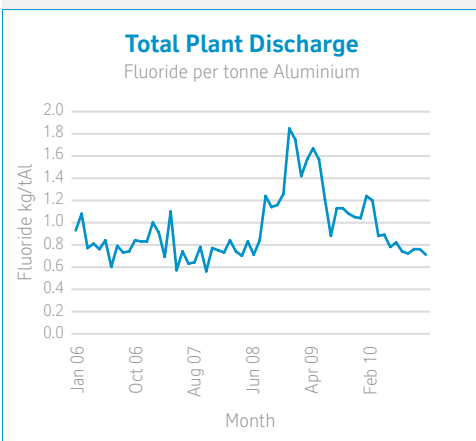
Near source confined and medium term recovery impact

##### Category 4 – Major

Impact that is unconfined and requiring long term recovery, leaving residual damage

##### Category 5 – Catastrophic

Impact that is widespread, unconfined and requiring long term recovery, leaving major residual damage



## Environment

NZAS priorities are to:

- Manage operational impacts to protect the environment
- Effectively mitigate and manage strategies to minimise waste
- Minimise discharges to air, land and water

Environmental incidents are categorised on a 1 to 5 scale, with 1 (minor) being the lowest impact incident and 5 (catastrophic) being the highest. The graph shows the smelter's performance on category 2 to 5 incidents since 2006.

One environmental incident was recorded in 2010. The category 3 incident was a pitch spill into the sea from the Tiwai wharf during ship unloading operations. A blockage had developed in the line and when the joint was dismantled a larger than expected volume (approximately 60 litres) of pressurised liquid pitch flowed onto the wharf and some entered the sea. A full investigation was undertaken and improvements to the system were implemented to prevent a similar occurrence. Improvements included the purchase of portable bunding, ensuring correct valve identification, pressure, temperature reading and valve location matched in procedures and on equipment. Procedure stages are checked off during discharge.

The high fluoride emissions from late 2008 to May 2010 were as a result of the closure of Reduction Line 1 following the failure of a transformer. The restart of Line 1 reduction cells was completed in 2010. NZAS continued its fluoride reduction programme during the

year and by the end of December was emitting fluoride at levels seen prior to the 2008 shut down of Line 1.

Fluoride performance is related to the efficiency of the dry scrubbers. The dry scrubbers are the smelter's main emission control equipment, where dust particles and fluoride gases are removed from reduction cell emissions. The best scrubbing efficiency is seen when the plant is operating at full capacity. During 'dry years' with power shortages and reduced productivity, fluoride scrubbing efficiency drops and the emission rate increases.

#### Spent Cell Lining (SCL) resource recovery

SCL is a by-product of the aluminium smelting process. It is the carbon and refractory lining from a reduction cell. Reduction cells are used to convert alumina (aluminium oxide) into aluminium. Prior to 2010, all SCL produced was retained in storage on the NZAS site.

In 2010, NZAS constructed an SCL crushing plant on site, an important precursor to a recycling programme which will see a significant reduction in SCL storage. Contracts are in place with overseas customers to recycle SCL to be used as alternate fuels and mineralising agents in manufacturing processes. The first overseas shipment took place in October 2010.

NZAS is also working with Holcim Cement's Westport Works to co-process SCL as an alternative fuel for Holcim's cement kilns. NZAS provided funding to construct the receiving facility at the Westport plant which was completed in late 2010. The first

shipments of SCL to Westport commenced in January 2011.

As a result of these efforts to secure offsite reprocessing of SCL, a slightly larger quantity of SCL was sent away for recycling than what was generated during 2010. Therefore the total stock of SCL on site diminished for the first time ever. This is a major achievement for NZAS and an important milestone in the complete reprocessing and removal of all SCL from the NZAS site.

#### Recycling of waste products

New waste reduction and recycling ideas are continuously investigated at NZAS. All timber pallets and waste wood are now recyclable, with new plastic types, newspaper and pamphlets added to the list of recyclable items at NZAS during 2010.

Following an agreement with Southland Disability Enterprises (SDE) – formerly known as Southland Enterprises - newspapers are now being collected along with plastics. SDE employees hand-sort the newspapers for onward recycling. On average 40 kilograms of newspapers are collected weekly on site. Until this agreement was finalised, all newspaper waste went to regional landfill.

#### Plans for Environment in 2011:

- Zero Category 2+ environmental incidents
- Zero licence defaults
- Reduction in greenhouse gas emissions
- Reduction in fluoride emissions
- Increased pest management of the Tiwai Peninsula

**ENVIRONMENT SOUTHLAND'S 2009/2010 COMPLIANCE MONITORING REPORT:**

*"Despite Line 1 not being fully operational for the majority of the year, NZAS successfully kept all fluoride emissions below consented levels. It was encouraging to note that the fluoride emissions returned to pre-Line 1 shutdown levels by April 2010. The fluoride emissions then continued to decrease and June 2010 recorded the second lowest level ever achieved. NZAS' commitment to complying with consent limits and having no environmental impact on the receiving environment is to be commended."*

**DOC PROGRAMME MANAGER BIODIVERSITY, JESSYCA BERNARD – LETTER OF THANKS FOLLOWING ENGAGEMENT WITH NZAS OVER TIWAI PENINSULA:**

*"The Department is very happy to be working with Rio Tinto Alcan/NZAS to consolidate and refine current pest control measures on the peninsula (amongst exploring other environmental opportunities). We support your current pest control operations, which meet RPMS requirements and lease agreements. We have had input and will continue to take an active role in assisting you with establishing your 2011-2015 Land Management Strategy. Over the last while, the Department has enjoyed more frequent discussion with you on enhancing the management of Tiwai Peninsula in the future, including pest control after, and recovery from, the most recent fire. Discussion on reducing future fire risks has also been entered into."*

**CASE STUDY 1**

**Recovering from the 2009 Tiwai Peninsula fire**

In the 1960s Tiwai Peninsula was grazed by a local farmer and only a limited amount of native plants were present. After the smelter was established, farming was limited to a few paddocks with sheep run by NZAS to monitor the environmental effects from smelting. The last sheep were removed in 1999 and the land was left to regenerate to a natural state. The peninsula consists of fine pea gravel with very little soil, so a challenge for most plants to get established. Red tussocks, flaxes, bracken and Coprosma are the main plants present. NZAS manages the conservation land on the

peninsula on behalf of the Department of Conservation (DOC).

On a spring day in late October 2009 a bush fire destroyed 930 hectares of vegetation on Tiwai Peninsula. The fire was possibly started by a spark from a tractor spraying for weeds.

NZAS and DOC worked closely together during 2010 to ensure a speedy recovery of the land. Increased pest control is expected to be required during 2011 to avoid a weed and animal infestation.

*One week after the fire – October 2009*



*Re-growth five months after the fire – March 2010*

**CASE STUDY 2**



*Waste carbon pile covered in plastic and pea gravel at the NZAS landfill*

**2010 Landfill capping projects**

The NZAS landfill was opened in 1969 during construction of the site. It has been used to deposit most waste arising from the production of aluminium over the last 40 years. NZAS' commitment to protecting the environment and continual improvement in our management of waste led us to make the decision to cap two of the main deposits in the landfill.

The Haysom's dross and carbon piles were re-profiled and covered using an impermeable plastic membrane, which will eliminate rainwater leakage through these deposits. It will also reduce the concentrations of contaminants in the water run off from the landfill. The visual impact of the black carbon material is also concealed. The pile is covered in locally mined pea gravel and, in time, this area will naturally regenerate with native plants.

# Community

In 2010, NZAS was involved in a number of major community partnerships, including Kakapo Recovery, Southland Science and Technology Fair, Southland Girls' High School Educational Partnership and the annual Community Assistance Programme.

## 2010 Community contributions (NZ\$)

Education	\$33,647
Environment	\$201,500
Health	\$13,434
Recreation	\$12,700
Culture	\$641
Other	\$252,975
<b>Total</b>	<b>NZ\$514,897</b>

Two major community contributions are included above:

- **'Environment'** – NZ\$200,000 Kakapo Recovery sponsorship
- **'Other'** – NZ\$250,000 donation to the 2010 Canterbury Earthquake Appeal

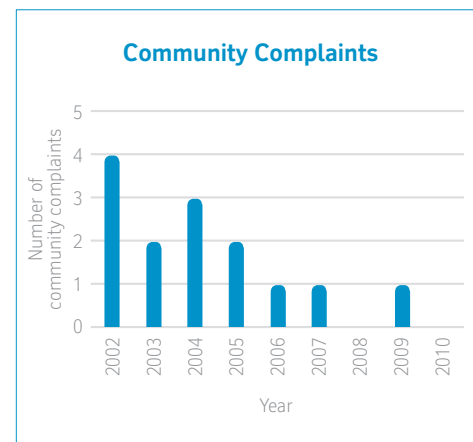
In 2010, NZAS hosted 414 people in 75 tours of the site.

A Social Risk Analysis was completed in 2010, with all identified risks transferred onto the NZAS Risk Register. A formal review of Community Relations activities was also conducted, including community support and funding programmes.

## Plans for community in 2011:

- Zero Category 2+ community complaints
- Full compliance with Rio Tinto Communities Standard
- Undertake a Baseline Community Assessment
- Continued participation in NZAS key stakeholder programme
- NZAS 40<sup>th</sup> anniversary celebrations
- Continue to support active partnerships including Kakapo Recovery, Southland Girls' High School Educational Partnership and Southland Science and Technology Fair

No community complaints were received in 2010.



## CASE STUDY 1

### Kakapo Recovery partnership

Kakapo Recovery is a partnership between Rio Tinto Alcan New Zealand Limited (RTANZ), the Department of Conservation (DOC) and Forest & Bird. A new five year NZ\$1million partnership agreement was signed in January 2011. RTANZ has provided approximately \$3.75 million to the programme since 1990.

The flightless kakapo is the heaviest parrot in the world, and is only found in New Zealand. Breeding appears to be dependent on the availability of key food supplies, such as fruiting Rimu trees, and will occur on average only every two to four years.

2010 was a special year for Kakapo Recovery as the partnership celebrated its 20th anniversary. It is the longest running partnership for both Rio Tinto and the Department of Conservation. Since the first signing of the agreement in 1990, the kakapo population has increased from 49 to 131 birds, however it remains critically endangered.

During 2010, seven NZAS employees assisted on Codfish and Anchor Islands, totalling 48 days of voluntary work:

- Kakapo supplementary feeding – 26 days
- Maintenance – 22 days

### MINISTER OF CONSERVATION, HON KATE WILKINSON – CONGRATULATING NZAS WINNING THE DOC CORPORATE CONSERVATION AWARD:

*“The successful Kakapo Recovery partnership is highly valued by the Department of Conservation. The partnership has led the way in demonstrating the significant conservation gains that can be achieved when business and government work together with a shared commitment and purpose. You can be very proud of the achievements made in the twenty years that the Kakapo Recovery Programme has been running. Successes such as the world leading artificial insemination programme have only been possible thanks to the long standing commitment made by Rio Tinto Alcan. I am delighted that this outstanding level of commitment has been duly acknowledged by the department.”*



(Above from left) Les Hoffman from E Hayes & Sons presenting Ryan Cavanagh (NZAS General Manager) with the Corporate Conservation Award, along with NZAS employees Don Faulkner, Andrea Carson & Rob Peterson

NZAS employees have volunteered over 860 days on the islands since the employee programme with DOC commenced in 2004.

NZAS was recognised by winning the DOC Corporate Conservation Award for its contribution to the Kakapo Recovery partnership during 2010. The award acknowledged the hard work and many hours NZAS employees have put into helping pull the kakapo back from the brink of extinction.



*Rob Peterson (NZAS Manager, Technology & Sustainability) and Bailey Lovett at the Science Fair*

### Assisting budding scientists in Southland

The 2010 NZAS Southland Science and Technology Fair was held in Invercargill in August. NZAS has been the major sponsor of the Fair for eight years. In addition to providing sponsorship for the event, a large number of NZAS employees volunteer their services, including being on the organising committee, providing administration support, judging, as well as supervising the public viewing days. Twenty six judges from NZAS assisted at the 2010 Fair.

Students ranging from Years 5 to 13 including required to investigate a topic of their choice using a scientific method of hypothesis, method, test and conclusions.

The major science award was presented to Bailey Lovett from James Hargest College for her project 'Bacterial Bivalves'. Bailey's entry progressed to the national competition 'Realise the Dream', where she was announced the Supreme Winner, with a prize of NZ\$7,000

and a trip to the 2011 International Science Forum in Finland. To top off a successful year for Bailey, she also won the New Zealand Prime Minister's Future Scientist prize and was awarded NZ\$50,000 towards her tertiary study which she will commence in 2011.

Bailey studied the level of faecal contamination in the Aparima River and at bathing sites on Riverton beaches. To do this she looked at the level of contamination in shellfish at sites around Riverton and looked at how large water flows affected the faecal counts at these sites. Prior to Bailey's research, Environment Southland had a policy of telling the public to wait one day before collecting shellfish or going swimming at Riverton after floods or high flows through the river and estuary. Bailey discovered it took at least three days for the faecal count to drop to a safe level for swimming or collection of shellfish. As a result of her project Environment Southland has changed its regulations.

### Educational partnership with local high school

NZAS hosted four Year 13 Southland Girls' High School (SGHS) students in September, as part of the annual educational partnership between the smelter and the school. The partnership has been in existence for three years and is designed to encourage female students to pursue careers within the engineering and science fields.

The first two days of the girls' seven day placement was spent undertaking inductions on site, a site familiarisation tour, and spending time with a number of female NZAS employees working in different roles. This gave the students the opportunity to ask questions about career paths within the Rio Tinto Group.

Following their induction, the students then spent the next week working on their chosen projects including gathering, testing and analysing data. They were also required to present their findings to the NZAS management team and SGHS Principal and Head of Science.

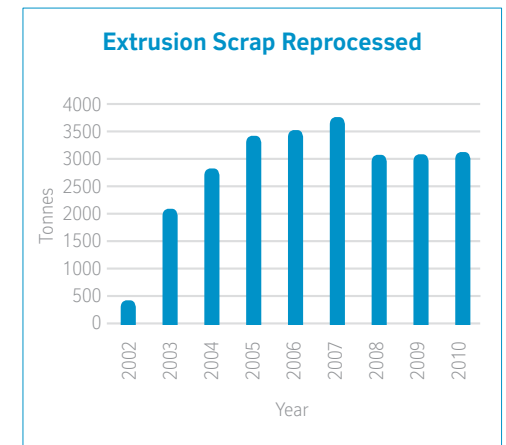
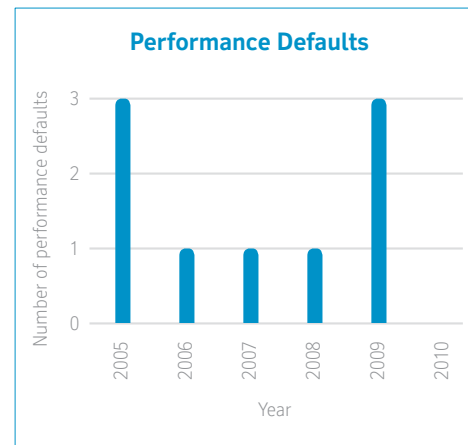
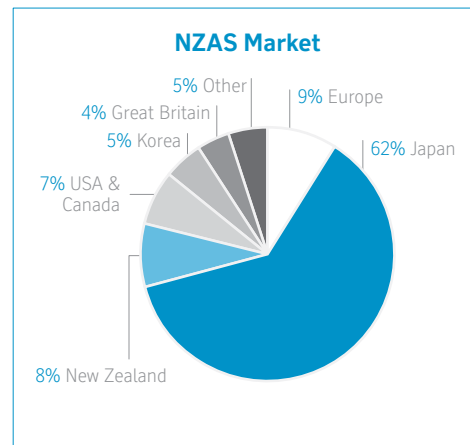
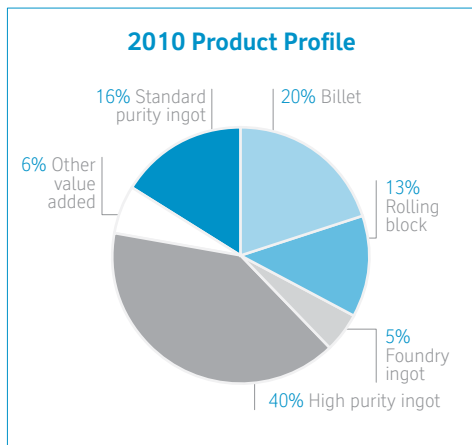
Projects undertaken in 2010 included measuring P69 reduction cell draught, Carbon Bake fuel efficiency audit, hydrogen sampling management, and silicon and iron analysis precision of 197 grade alloy.

*(from left) Paul King (SGHS Head of Science), Elizabeth Shields, Isabel Tait, Courtney McCrostie, Sam Deal, Yvonne Browning (SGHS Principal) & Ryan Cavanagh (NZAS General Manager)*



# Market Position

NZAS continues to be a significant supplier of aluminium to Japan, as well as supplying metal to other Asian countries, the United States of America, Europe, Great Britain and New Zealand.



## NZAS production

	2010 Actual
Saleable metal	343,335 tonnes
Per cent value added	84%
Extrusion scrap reprocessed	3,109 tonnes
Billet	67,631 tonnes
Foundry	16,184 tonnes
High purity	137,619 tonnes
Rolling block	45,743 tonnes

A customer raises a performance default when a contract term or customer specified requirement is not met. Zero performance defaults were recorded in 2010 against a target of zero.

NZAS has been buying back extrusion scrap from a domestic customer since 2002. The extrusion scrap is reprocessed on site, with 3,109 tonnes recycled in 2010. Recycling aluminium requires only five per cent of the energy needed to produce the original primary aluminium and also significantly reduces CO<sub>2</sub> emissions.

## Billet optimisation project

Smelting operations within Rio Tinto Alcan are being restructured to allow each Business Unit to produce products best suited to their facilities, strengths and the market. This strategic decision will result in the closure of the billet casting facility at Kitimat in Vancouver with most of the products being transferred to NZAS.

This transfer will increase the utilisation of this casting facility. The additional billet diameters and alloy mixes increases the product range at NZAS. This in turn will increase revenue.

Extensive capital investment to the value of NZ\$11 million was approved to fund the product transfer. The capital investment includes new billet casting tables and moulds (to enable casting of different diameter

billets), and upgrading the water system, billet handling equipment (conveyors), homogenising furnace, and saws to handle the larger billets. To ensure the quality of the billet meets the customer requirements the ultrasonic testing capability will be upgraded and a Rotary Flux Injector installed to improve the metal quality.

As the capability is increased, there will be a multitude of product trials, some of which began during 2010 and will continue into 2011. The new products will be for both existing NZAS customers and new customers, predominantly in Japan and South Korea. NZAS plans to cast an additional 3,500 tonnes of billet for 2011 increasing to 14,400 tonnes for 2012 onwards.

*Preparing to remove billet from casting pit*



# Operational Excellence

NZAS works to achieve operational excellence in its products and processes by focussing on continuous improvement, 'Lean Six Sigma', innovation and reliability. We refer to all of this work as our Business Improvement programme.

## Lean Manufacturing

Lean Manufacturing focuses on eliminating waste, standardising work practices and using visual systems to manage the workplace to deliver process stability.

## Six Sigma

Six Sigma is a structured, statistical problem solving methodology used to achieve significant advances in operating performance.

## Business Improvement value

During 2010, NZ\$18.7 million was delivered through Lean Six Sigma initiatives. This total included projects on metal purity, cell batching optimisation, SCL disposal, Metal Products VDC1 block saw throughput, current efficiency improvements and reprocessing of cell bottom metal.

## Plans for Operational Excellence in 2011:

- NZAS continues to be innovative in its application of both the Lean and Six Sigma methodologies. Our focus for 2011 is to continuously improve the implementation of these tools with the aim of securing the plant for the future. The 2011 improvement plan is for NZ\$12.3 million.

## CASE STUDY 1



Xiaoling Liu, President, Rio Tinto Alcan Primary Metal Pacific (left) presenting Bravo! Awards to Ivan Padget, Scott Westbury & Mike Andrew

## Kaizen event in Metal Products

The word Kaizen means 'change for the better'. A DMAIC (Define, Measure, Analyse, Improve, Control) Kaizen event is the merging of the discipline of Six Sigma and the speed of Lean, utilising team work to rapidly eliminate waste from a process, with an expectation that 80 per cent of the proposed actions are completed during the event. The event usually lasts for five days with planning and follow-up occurring outside the event week.

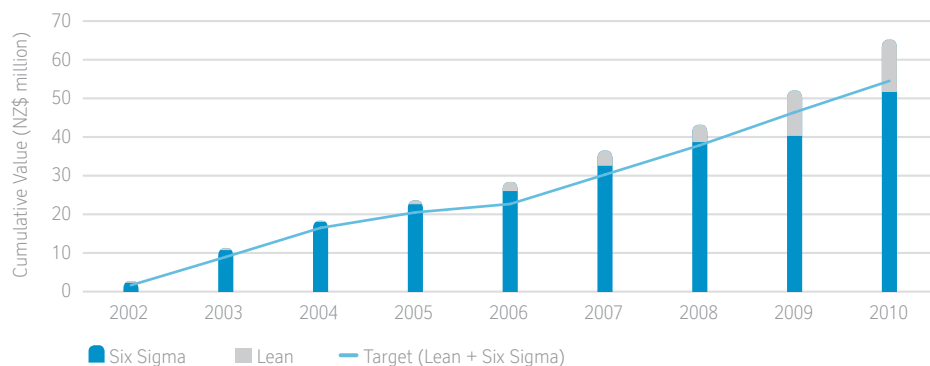
In May 2010, a DMAIC Kaizen event team was formed to tackle the issue of block saw throughput at NZAS. The stretched target for the event was to reduce the block saw cycle time by 50 per cent. Over five days the team radically changed the way the machine operated by introducing 'flow' into the process and exceeded the targeted reduction in cycle time. The team embraced the Kaizen mindset and made the change happen. The

initiative, leadership and accountability demonstrated in the delivery of sub-tasks were critical to achieving the outcome. Co-operation and encouragement extended beyond the immediate Kaizen team with exceptional support received from department and site leaders, including Metal Products maintenance and operations, Information Systems, Procurement and the Mechanical Workshops.

Potential capital expenditure of NZ\$5.25 million on a new block saw facility has been avoided.

The event was nominated for a site level Bravo! Award and was a winner in the Leadership category. The event then went on to win an award in the Rio Tinto Alcan Asia Pacific section. The award ceremony was held in Brisbane in November 2010.

Cumulative Value Delivery (NZ\$ million)





DANGER  
EARTH  
POTENTIAL



If you have any questions or would like to provide feedback on the NZAS 2010 Sustainable Development Review, please contact:

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