

Rio Tinto Alcan

**Lynemouth Smelter and
Power Station**

**Environmental
Report 2007**



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Message from the Managing Director



Welcome once again to the annual environmental statement for Lynemouth smelter and power station. This is an interim annual statement following the full report from 2005 and is a concise update on our performance against the objectives and targets set at the beginning of 2007.

Welcome also to Rio Tinto Alcan which was created on 25 October 2007 when Rio Tinto and Alcan joined forces to create a new global leader in the aluminium industry.

At Lynemouth we are committed to minimising our environmental footprint and continue to pursue innovative technologies and solutions to strengthen our sustainability. Many of the ways we are achieving this are outlined within this report.

In addition to the positive direct impact we can have at the smelter and power station, we continue to provide leadership and direction on environmental issues at a local, regional and national level through our presence on various bodies and initiatives.

As in every previous year, we have invested heavily both financially and in time, to ensure that we meet the many

regulations and directives that impact on the business and we continually challenge our industry benchmarks when it comes to addressing our environmental responsibilities.

The challenges we face come in many forms. As an example of this, in 2007 the Environment Agency granted us a new IPPC permit covering the combined operations at Lynemouth smelter and power station. The Permit covers plant operating conditions, emission limits for substances to air, land and water as well as all reporting requirements. It is far reaching and very demanding - and we welcome it. If we are going to seriously tackle concerns for the environment then we need robust measures.

The new permit brought about tougher emission limits for both the smelter and power station along with thirteen further improvement conditions which must be responded to over the next four years.

At Rio Tinto Alcan, we are as pleased as the general public that these requirements are in force. They are necessary and I know that we have the people and processes in place to ensure that we meet them in every way.

A handwritten signature in black ink, appearing to read 'Wyn Jones'.

Wyn Jones OBE, Managing Director

This report has been prepared to comply with the requirements of the EC Eco-Management and Audit Scheme.

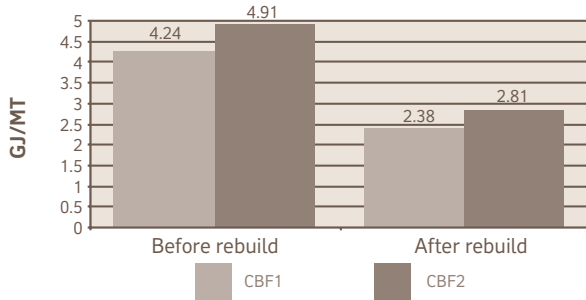
Lynemouth Smelter and Power Station are part of Alcan Aluminium UK Limited and report environmental issues to the parent company Rio Tinto Alcan.

Highlights during 2007

Ring furnace 1 rebuild

Anode baking efficiency has been greatly improved following the redesign and rebuild of Carbon Bake Furnace 2 in 2006 (see 2006 statement for further details) and Carbon Bake Furnace 1 in 2007. Gas consumption has been reduced by 43.5% using 'state of the art' technology for both the flue design and the firing system. In addition to the energy saving and its CO₂ reductions, the volume of fume going for treatment has been significantly reduced.

Lynemouth - Carbon Bake Furnace - Gas Consumption



Carbon Bake Furnace 1 and Carbon Bake Furnace 2 gas consumption reduced by 44% and 43% respectively.

Ash Recycling

Ash is a direct waste product from burning coal at Lynemouth Power Station and has shown to be useful as a sub-fill material in the construction industry and for making grout. After successfully reusing ash in 2006 (see previous statement) ash recycling continued into 2007 where over 63,000 tonnes was removed from the Power Station and 100,000 tonnes of ash was taken from the Ash Lagoons landfill site for use as a grouting material and as a sub-fill material within the construction industry. Using ash as a product offers real environmental benefits by removing the need to use raw materials. It also means that a waste that would usually be landfilled becomes a useful product.



Articulated lorries waiting to be loaded with ash.

Ring furnace operations following the re-build .



Capping Woodhorn Landfill

Woodhorn Landfill, previously used primarily for the disposal of Spent Potlining (SPL) was successfully closed and capped off in September 2007. The capping of the landfill site required a robust engineering design and Alcan worked in conjunction with G & B Civil Engineering in order to complete a design that was approved by the Environment Agency. The finished design has a gas capture system that collects any gases in the landfill and disperses them safely and naturally into the metre of surface soil at the top of the cap. Capping the landfill also enabled Alcan to utilise over 46,000 tonnes of Pulverised Fuel Ash (PFA) that would otherwise have gone to landfill as a fill material to bring the landfill up to its finished contours.



Gas collection liner.

Wheel Washing at the Power Station

In 2007 Lynemouth Power Station successfully installed a wheel wash near the coal storage entrance of the site and all vehicles leaving the coal plant and the ash lagoons were required to have their wheels washed before leaving the site. The installation of this piece of equipment has greatly improved the cleanliness of the roads directly outside the site as all vehicles have clean wheels when they get onto the main roads.

Fluoride Emissions

During 2007, for the second year in a row, record low smelter fluoride emissions were reported with site emissions of 0.9 kg(fluoride)/ tonne(aluminium). The significant decrease on 2006 emissions followed on from the success of earlier continuous improvement projects and included further improvements to reduce fugitive gas and dust emissions from the potroom process. These included improved process monitoring, reduced scrubber downtime through preventative maintenance and improved capture of potroom process emissions, including the use of a thermographic camera to identify blocked scrubber ductwork. A team of Alcan technology experts visited the site during February to carry out a comprehensive audit of the potroom scrubber systems which praised the improvements at Lynemouth whilst providing specialist advice on achieving even lower emissions in future years.

Wheel washing underway.



Environmental Management Systems

Environmental Policy

The policies for the smelter and power station were reviewed as part of the annual management review process and it was decided that no changes were required for 2007.

Certification of Environmental Management Systems

In July 2007 Lynemouth Smelter achieved certification to PAS 99 (Publicly Available Specification), the worlds first Integrated Management System (IMS). The idea behind an IMS is that of a single holistic system that enables operations to run more effectively. The Smelter has operated with an integrated management system for several years and PAS 99 gives external verification that the integrated system conforms with expected standards. BSi continue as external verifiers for the site in order to confirm our management system complies with the requirements of BS EN ISO 9001:2000, BS EN ISO 14001:2004 and OHSAS 18001:1999.

Lynemouth Power Station operate a separate integrated management system, verified by EAQA, with certification to BS EN ISO 14001:2004 and OHSAS18001:1999.

The management system applies to all levels of employee and commits everyone to continuous improvement in all aspects of the business. Protection is everyone's responsibility at Lynemouth Smelter and Power Station and forms an essential part of day to day operations and future plans.

Licences and Legislation

Pollution Prevention and Control (PPC) Regulations

On 9th November 2007 a new PPC permit issued by the Environment Agency took effect, covering the combined operations at Lynemouth smelter and power station. The permit covers plant operating conditions, emission limits for substances to air, land and water as well as all reporting requirements. The new permit brought about tougher emission limits for both the smelter and power station along with thirteen improvement conditions which must be responded to over the next four years.

Permit Requirements

Details of our IPPC licences can be found on the public register at the Environment Agency offices in Newcastle. Annual reports of our emissions can also be found at the Environment Agency web site, www.environment-agency.gov.uk.

During 2007 there were no occasions when the Environment Agency were notified regarding potential cases of non-compliance with permit conditions.



Demonstration of Continual Environmental Improvement

Lynemouth Power Station

Summary of Lynemouth Power Station performance against Environmental Objectives and Targets 2007

- LCPD / IPPC
 - Progress reductions in SO₂ emissions maintaining control over dust.

Result: Overall SO₂ emissions show a downward trend, whilst dust emissions remained below the limit of 50mg/m³. Compared to 2006 there was a slight increase, however the SO₂ emission during 2006 was unusually low as a significant quantity of low sulphur coal was utilised to manage a false local air quality event at Newbiggin caused by a defective monitor outside the control of Alcan.
- Install new oil burners for boiler light up
 - Target installation of new burners on 2 units during 2007

Result: New oil burners on 2 generating units were installed during 2007.
- Ash management
 - Increase ash recovery for re-use

Result: An additional 46,000 tonnes of ash was utilised in the closure and capping of Woodhorn landfill site. A local housing scheme and road building project helped ensure we recycled as much ash as possible.
 - Transfer ash from lagoon 4 to retain wet lagoon capacity

Result: Approximately 12,000 tonnes of ash was transferred from lagoon 4 to retain wet lagoon capacity.
- Improve oil storage facilities and bunding
 - Oil tanks and spill containment improvements

Result: A full assessment using the latest Environment Agency guidance was made and an action plan was developed. Some improvements were implemented with others to follow during 2008.
- EU ETS
 - Increase use of biomass

Result: A total of 2,734 tonnes of biomass was used during 2007 compared to 2,286 tonnes during 2006.
 - Install automatic coal sampling

Result: The automatic coal sampling equipment was installed and commissioned in December 2007.
 - Progress water recovery and minimise use of fresh water

Result: The water recovery initiative was halted mid 2007 due to contamination reaching the water treatment plant where the water was reused. Additional water reduction projects are under evaluation as part of the site Continuous Improvement (CI) programme.

Environmental Objectives and Targets for 2008

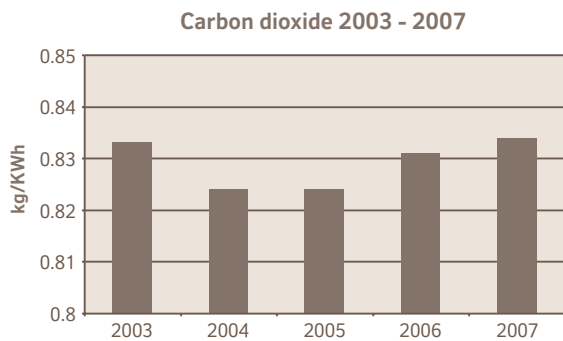
- Respond to the new IPPC permit improvement condition requirements on continuous emissions monitoring, management of fugitive emissions and options for increased use of biomass.
- Implement the Site Protection and Monitoring Plan (SPMP).
- Reduce SO₂ and NO_x emissions in accordance with new permit limits.
 - 23,000 tonnes SO₂
 - 7,500 tonnes NO_x
- Develop further options for reductions of CO₂ and SO₂
- Investigate feasibility of measurement of fine particulate at the ash lagoons
- Devise a calibration system to determine the accuracy of the coal belt weighers

Lynemouth Power Station Operational Performance

Releases to Air

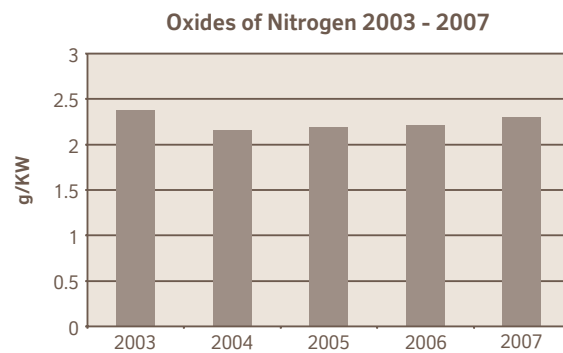
Carbon dioxide (CO₂)

Biomass use at Lynemouth was higher than in 2006, however CO₂ levels are slightly higher in kg/kWh due to minor variations in thermal efficiency. CO₂ emissions remain below the targets set in the Climate Change Agreement (CCA) and EU ETS for the power station.



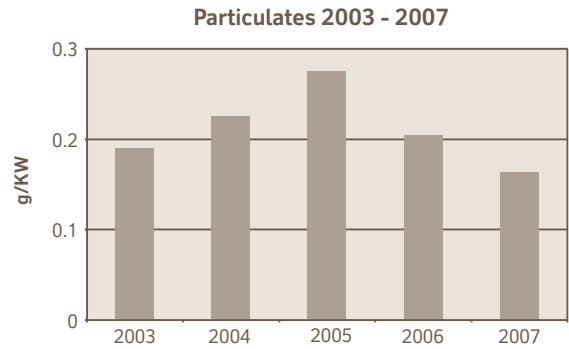
Oxides of nitrogen (NO_x)

NO_x continues to be well managed but further improvements in combustion optimisation are required to maintain current emission levels and meet future limits.



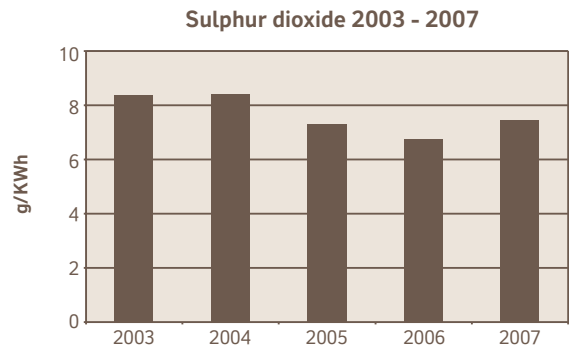
Particulate

Particulate emissions improved compared to previous years with improved operational control when burning low sulphur coal.



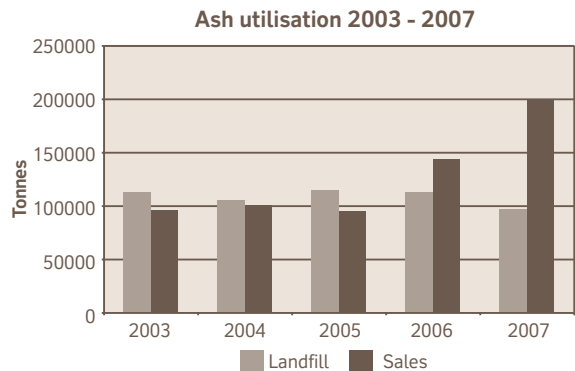
Sulphur dioxide (SO₂)

Managing local air quality is an integral part of the power station operations and the use of low sulphur coal ensures continued compliance with the Local Air Quality Objectives. Emissions in 2007 increased slightly due to a reduced consumption of low sulphur coal as the local air quality management system indicated less risk during 2007.



Ash Lagoons

Sales of ash from Alcan ash lagoons continued to grow in 2007 with over 100,000 tonnes of ash taken from the lagoons and used as a sub-fill material in road construction projects and as a fill material for an internal construction project.



Lynemouth Smelter

Summary of Lynemouth Smelter Performance against Environmental Objectives and Targets 2007

- Aim to achieve fluoride emission targets of:
 - Potline 1 <0.73 kg/tonne
 - Potline 2 <1.13 kg/tonne
 - <1 kg/tonne site average

Result: The site fluoride emission target of <1 kg/tonne was achieved with a best ever performance for both potlines of 0.9 kg/tonne. The ambitious individual potline 2 target was only narrowly missed with actual performance for potline 1 at 0.63 kg/tonne and on potline 2 it was 1.18 kg/tonne.
 - Spent potlining
 - Progress contract with a third party to recycle 60% of the 'first cut' carbon material (specification 50 - 200mm).

Result: Discussions with the third party were brought to a close during 2007 due to environmental permitting difficulties and product classification.
 - Continue to explore additional recovery routes for SPL second cut and fines.
- Result:** Additional recovery routes for SPL second cut and fines were identified and a trial with a third party is scheduled for January 2008. The laboratory scale trials have been promising and the results from the process trial will indicate if the third party recovery route can be developed further during 2008.
- Progress demolition and storage building for SPL.
- Result:** The plans for a demolition and storage building for SPL were developed and agreed with building work expected to commence during 2008.
- Complete the closure and capping of Woodhorn landfill site.
- Result:** The closure and capping of Woodhorn landfill site was completed in September 2007. The waste was re-profiled and covered with ash from the power station. This was then covered with an impermeable membrane, top soil and seeded with grass.
- Develop an action plan to address the oil contaminated ground at the 402 area (potline rectifiers).
- Result:** The action plan to address the oil contaminated ground at the 402 area (potline rectifiers) was agreed and work will commence Q1 2008. The drainage in this area will be diverted through an above ground oil separator enabling any oil collected to be recycled.
- Reduce GHG emissions and target 15.5kg CO₂/tonne aluminium.
- Result:** The GHG emission target of 15.5kg CO₂/tonne aluminium was achieved.
- Waste
 - Identify and initiate re-use options for the bagged carbon dust.

Result: All bagged carbon dust is now sent to a third party for recycling and the backlog that had built up has been removed.
- Trial and implement alternative solutions for management and disposal of oil contaminated waste.
- Result:** Oil contaminated waste has been diverted from landfill and a new system of washing and recycling oil contaminated material by a specialist waste management company is in place. Construction of a dedicated storage building for the new system commenced late 2007 and completion is expected by the end of January 2008.
- Water
 - Target 1.75m³/tonne cast metal

Result: The target of 1.75m³/tonne cast metal was achieved with savings identified through additional metering and the implementation of a Continuous Improvement 'Green Belt' water saving project

Environmental Objectives and Targets for 2008

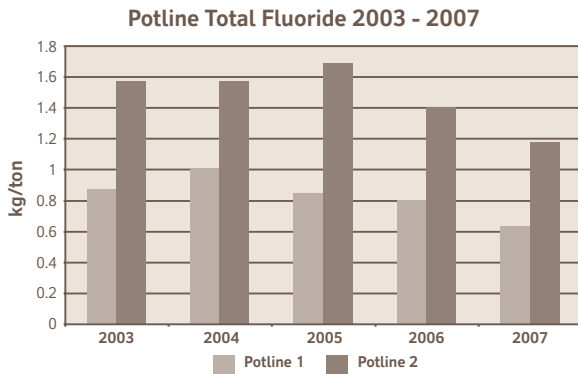
- Aim to further reduce fluoride emission with targets of:
 - Potline 1 <0.67 kg/tonne
 - Potline 2 <1.13 kg/tonne
 - <0.9 kg/tonne site average
- Spent potlining
 - Continue to develop alternative recovery or treatment routes
 - Complete the demolition and storage building for SPL
- Set additional improvement programmes in response to the new IPPC permit improvement condition requirements on continuous emissions monitoring, management of fugitive emissions and fluoride reduction options.
- Implement the Site Protection and Monitoring Plan (SPMP).
- Complete the installation of equipment to address the oil contaminated ground at the 402 area (potline rectifiers).
- Reduce GHG emissions and target 15.5kg CO₂/tonne aluminium based on EU ETS/CCA overlap calculation.
- Waste
 - Focus reduction on process waste and aim to achieve <5kg/tonne
- Water
 - Target to reduce water usage to below 1.65 m³/tonne cast metal.

Lynemouth Smelter Operational Performance

Releases to Air

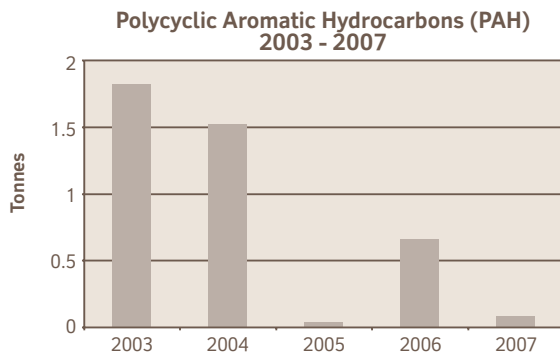
Hydrogen fluoride (HF)

Potline 1 achieved its lowest ever recorded emissions at an average of 0.6 kg/tonne aluminium, with the emission well below the target of 0.73 kg/tonne. Potline 2 emissions remained fractionally above our internal target (the internal targets are much tighter than the PPC permit limits) although they were the lowest ever recorded at 1.18 kg/tonne. As an average site emission this is a significant reduction on 2006 emissions, reaching a site average of 0.9 kg/tonne, compared to an average of 1.1 kg/tonne in 2006.



Polycyclic Aromatic Hydrocarbons (PAH)

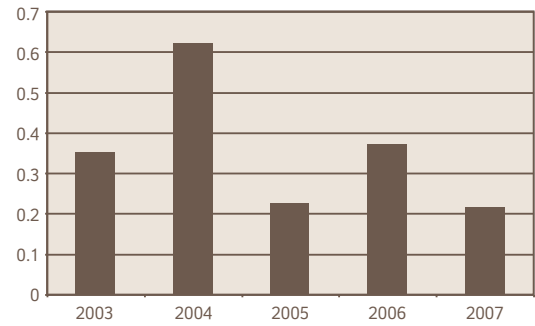
Levels of PAH show a downward trend in 2007 that can be attributed to the rebuilding of the ring furnaces and the upgraded firing system. PAH are the volatile components driven off during the forming and baking of carbon anodes. Sampling and analysing PAH is complex and we have seen a range of results from the sampling carried out at Lynemouth over the years. The variation shown in the annual totals can be a result of the sampling variation, however overall the trend is a reduction in emissions as a result of the improvement work carried out.



Polyfluorocarbons (PFC)

In 2007 improved energy efficiencies in the process have resulted in the lowest levels of PFC's currently recorded. PFCs are produced at low levels during a part of the reduction process called the 'anode effect'. Anode effects are measured in terms of frequency (AEF - number per pot) and duration (AED in seconds).

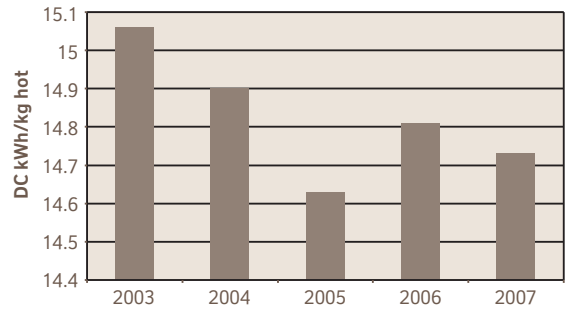
Lynemouth Smelter Anode Effects (AEF x AED)



Energy efficiency

Improved energy efficiencies in the process are shown again in the graph below

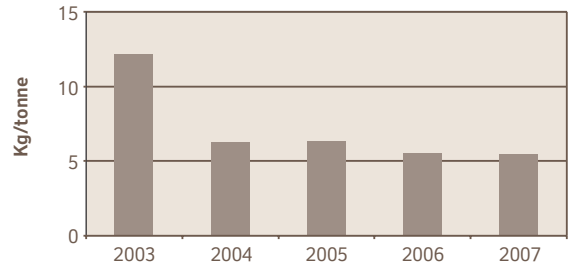
Smelter Electrical Energy Efficiency



Waste

Reducing waste continues to be a priority in 2007 with a final waste generation figure of 5.5kg/tonne, the same as 2006. With a target of 5kg/tonne the hard work will continue in order to reach these levels, and further reduce waste.

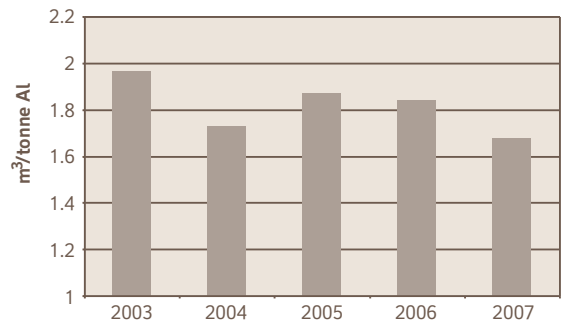
Lynemouth Smelter Waste to Landfill (excluding SPL) 2003-2007



Water

Although aluminium production has increased water consumption has remained relatively constant. As shown in the proposed objectives and targets for 2007, water use will be one of the key performance indicators for the future.

Water consumption at Lynemouth Smelter 2003 - 2007



Glossary of terms

CCA - Climate Change Agreement.

CO₂ - Carbon dioxide. A gas which has been linked to the greenhouse effect and global warming.

CO_{2e} - Carbon dioxide equivalents. Gases released which potentially have an effect on global warming are expressed as the effect of an equivalent quantity of CO₂.

DC - Direct current

DEFRA - Department for Environment, Food and Rural Affairs.

EU ETS - European Union Emissions Trading Scheme.

GJ - Giga joules.

GHG - Greenhouse gas.

IPPC - Integrated Pollution Prevention and Control.

kWhr - Kilowatt hour. A measure of electrical energy.

LCPD - Large Combustion Plant Directive.

Mg/m³ - milligramme per cubic meter. A measure of the concentration of a substance in air.

PAH - Polycyclic Aromatic Hydrocarbons. A group of chemical compounds produced by the incomplete combustion of organic matter.

Particulate - Fine solids suspended in air, commonly referred to as dust.

PFA - Pulverised fuel ash.

PFC - Polyfluorocarbon. A group of gases produced during anode effects with a high CO_{2e}.

Potline - Lines of cells or 'pots' used to produce aluminium by the process of electrolysis.

SO₂ - Sulphur dioxide. A gas released when sulphur in fuel is oxidised.

SPL - Spent pot-liner; the cell cathode.

Environmental Complaints

9 complaints were made by members of the public during 2007 mainly relating to alumina/dust releases. All incidents were investigated and discussed with the complainant, and where necessary remedial action taken.

Independent Verification

Verifiers declaration

This statement has been validated by David Robinson of BSi who are accredited for EMAS verification with the reference UK-V-0002. The validation was completed on 14th April 2008.



David Robinson
Lead Verifier

Date: 9th & 10th April 2008

Next statement

The next statement, covering the period 2008 will be submitted for verification by 31st March 2009.

Further Information

To obtain further information regarding the content of this report or to request copies of previous Environmental Statements, please write to:

Mr R. J. Anderson
Environmental Regulations Manager
Alcan Aluminium UK
Lynemouth Smelter
Ashington
Northumberland
NE63 9YH

Tel: 01670 393811

Fax: 01670 393956

Further information regarding environmental issues associated with the aluminium industry can be found at the following web sites.

www.alfed.co.uk
www.eaa.net
www.aluminium.org

Rio Tinto Alcan Aluminium UK
Lynemouth Smelter
Ashington
Northumberland
NE63 9YH

Tel: 01670 393811
Fax: 01670 393956