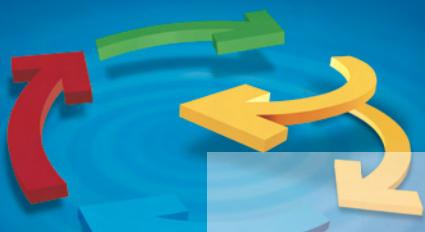


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THE APPLICATION OF EHS FIRST™

TO ALCAN INC.'S JOINT VENTURE ALUMINUM SMELTER IN NINGXIA, CHINA

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Yang Xiaoping was a wagon pusher working for a contractor at the Alcan aluminum smelting complex in Ningxia, China. The plant is a joint venture created in 2004 between Alcan, the Qingtongxia Aluminum Group Company (QTX) and Ningxia Electric Power Development and Investment Co. Ltd. Before the creation of the joint venture, environment, health and safety (EHS) practices at the facility were poor and record-keeping virtually non-existent. Subsequent to Alcan's involvement, EHS performance at the smelting complex improved dramatically. However, on January 12, 2006, Mr. Xiaoping suffered a fatal injury when he was crushed between two loaded wagons being pushed by hand into the combined pedestrian and vehicular entrance of the complex.

The business case presented here describes Alcan's involvement in the Ningxia joint venture, the implementation of Alcan's approach to Environment Health and Safety EHS FIRST™ in Ningxia, and events leading up to and following Yang Xiaoping's workplace fatality. The case is described largely through the eyes of Alexandre Gomes, the Chief Executive Officer of the joint venture.



MAKING EHS A PRIORITY AT ALCAN NINGXIA



Alexandre Gomes is the Chief Executive Officer of Alcan Ningxia. A 20-year company veteran, he was previously plant manager at Alcan operations in Brazil and in Canada.

Since 2004, the Ningxia facility has shown substantial improvements in productivity and profitability. While relations with the Chinese joint venture partners are generally good, it is clear that the local partners' priorities are profitability and low cost. Alcan, on the other hand, regards Ningxia as a model facility and is implementing business practices that are customary within Alcan yet far exceed Chinese standards. While directed towards long-term profitability and growth within the Chinese market, these business practices include very high EHS standards and goals.

THE GLOBAL ALUMINUM INDUSTRY

The global aluminum industry employs over 1 million people, and constitutes a sizable presence in both the developing and developed worlds. The industry includes over 3,000 companies employing 200,000 workers in Europe, 42,000 in Japan, 17,500 in Australia and 21,000 in Canada¹. Four large companies — Alcan, Alcoa, BHP Billiton and Norsk Hydro — dominate the industry. In recent years the companies Rusal, from Russia and Chalco, from China have also become important producers. These vertically integrated corporations are involved in all aspects of aluminum production (see Exhibit 1) from the mining of raw materials to the fabrication of aluminum products.



Bauxite Mining — Bauxite is the raw material of aluminum production. Major producing nations include Australia, Guinea, Brazil and Jamaica². Mining is the only step in aluminum production that can not be relocated: subsequent steps require producers to reach around the world in search of lower costs.

Alumina Refining — When crushed bauxite is heated with caustic soda (sodium hydroxide), aluminum oxide or alumina, a white powdery substance, is formed. Typically, alumina refineries are located adjacent to bauxite mines.

Aluminum Smelting — An electrolytic process (“reduction”) removes oxygen from alumina resulting in molten primary aluminum which is then cast and shipped for fabrication. Reduction requires very large amounts of electricity. Consequently, these smelters are located near to abundant sources of competitive energy such as massive hydroelectric dams, rich coal sources and Middle East gas fields. While more efficient processes exist, there are still plants employing the older, health-riskier, and less environmentally safe Söderberg process.

Fabrication — The aluminum ingots are processed by casting, extrusion, or rolling. Fabrication plants are typically located close to their ultimate markets. Major market segments include containers and packaging, building and construction, transportation and electrical applications.

¹ International Aluminum Institute (IAI)

² Mineral Information Institute



Since 2000, the aluminum industry has been subject to a wave of consolidation driven by long-term decline in the real price of aluminum and eroding margins, pressure to improve return on investment, diminished control of aluminum pricing, technological changes, competition from other materials such as plastic and steel, and changing demands by global customers.

The major environmental challenges for the industry relate to the high energy consumption and emission for the primary aluminium production, and of related greenhouse gasses (GHG), of particular concern where smelting is powered by coal-fired generators. In addition to emissions of particulate matter, fluorides, sulfur compounds and para-cyclic aromatic hydrocarbons (PAH) associated with the smelting of primary aluminum. Bauxite Residue, a caustic mineral-rich slurry by-product of the mining and refining of bauxite, requires careful disposal. So do spent pot linings (SPL), which are the residue of the carbon and refractory lining of aluminum smelting furnaces, known as pots. SPL, which contains significant amounts of absorbed fluoride along with traces of cyanide, sodium, PAH and other contaminants, is classified as hazardous waste by many countries: if simply discarded as unsecured landfill, SPL may be scrounged by impoverished locals to construct housing or as an energy source. Other environmental concerns include water conservation in arid zones and wastewater quality.

The full life cycle benefits of aluminum applications and its properties can contribute to the global reduction of GHG emissions in various product applications:

- Light weight: replacing heavier materials in transportation,
- recyclability: aluminum can be indefinitely recycled without losing its properties,
- brightness: new products for renewable solar energy applications.

Until recently, aluminum ranked among industries with a high rate of work-related injuries. Major health issues relate to exposure to physical hazards such as heat and noise, particulate exposure, respiratory and dermal contact with carcinogens, heavy lifting and the ergonomics of difficult postures. Major safety issues relate to mobile equipment and pedestrian safety, falls from heights, burns and explosions, equipment failure and confined spaces.

In recent years, all of the major aluminum companies have developed stringent health and safety programs to reduce serious workplace injuries. They have also set aggressive targets to reduce energy use and emissions. In 2003, the International Aluminum Institute (IAI), the world aluminium association launched the *Aluminum for Future Generations Sustainable Development Program*. The Program is a voluntary global undertaking by the Members of the IAI, twenty six CEOs whose companies (including Alcan) represent over 75% of the world's aluminum production. The program comprises twelve voluntary objectives as outlined in Exhibit 2.

ALCAN

HISTORY



Founded in 1902, Alcan is one of the world's leading suppliers of bauxite, alumina and aluminum, and a leading fabricator of engineered and packaging materials. The company employs 68,000 workers in 430 locations in 61 countries and regions. Alcan has expanded rapidly in recent years, driven by the acquisition of Switzerland-based Algroup (Alusuisse) in 2000 and Paris-based Pechiney in 2003. With its head office in Montreal, Canada, Alcan is a public company traded on the Toronto, New York, London, Paris and Swiss stock exchanges with 2006 revenues of US\$23.6 billion.



ALCAN'S INTEGRATED MANAGEMENT SYSTEM



The diversity of Alcan's activities creates challenges, including different business paradigms, drivers and performance metrics. Furthermore, operating worldwide in both well-established and emerging economies generates its own distinct business challenges, such as language and cultural barriers, political instability, corruption and transparency issues, poverty, disease and human rights violations.

Alcan has developed the Alcan Integrated Management System (AIMS) to ensure that all of its businesses share the same priorities. These priorities are reflected in the four pillars of AIMS: *Value-Based Management, EHS FIRST, Continuous Improvement and Our People Advantage*.

EHS FIRST

Introduced by then President and CEO Travis Engen, Alcan took the first steps toward a more concerted and systematic approach to EHS management in 2001. At the rollout of *EHS FIRST* in 2003, Mr. Engen and his senior management team signed a formal commitment to make EHS an integral part of every job, program and process, by visibly and actively promoting and driving EHS excellence at work and in the community. This top-level commitment continues today with Alcan's current President and CEO Richard Evans.

EHS FIRST is a mindset, and spells out the Company's key EHS requirements, roles and responsibilities. It integrates ISO 14001 (environmental) and OHSAS 18001 (health and safety) specifications. It emphasizes evolution and continuous learning. It applies not only to Alcan employees but to on-site contractors and their employees, as well as to visitors to its facilities. *EHS FIRST* incorporates also life cycle thinking with a commitment to Product Stewardship. *EHS FIRST* requires that Alcan's high EHS standards are applied at all its locations, regardless of how little local laws or regulations may demand.

As part of *EHS FIRST*, site managers are responsible for defining, classifying and reporting EHS events according to specific directives. Alcan also conducts regular formal audits to support continual learning, improvement and sharing of best practices, as well as to meet corporate due diligence requirements. In addition to the audit program, each business group must conduct and prepare an *EHS Management Review* at least once a year. New facilities are initially assessed by performing a GAP analysis (see Exhibit 3) but must be fully compliant with *EHS FIRST* within two years of their acquisition or start-up.

The *EHS FIRST* model identifies the four cornerstones required for the system's successful implementation:



Management and leadership commitment

Line ownership and meaningful employee involvement

Aware, trained and committed workforce

Effective two-way communication

EHS FIRST is integrated into Alcan's performance evaluation system. Each professional employee has a formal evaluation at least once a year and is given specific *EHS FIRST* objectives. Employees' compensation and recognition are partially based on their EHS performance.

To date, a total investment of US\$36 million in *EHS FIRST* has delivered US\$43 million of cost savings (mostly reduced lost time injury costs and insurance costs) and environmental and health benefits estimated well in excess of US\$1 billion. The Alcan Sustainability Report presented in Exhibit 4 summarizes performance since the introduction of *EHS FIRST*.



ALCAN NINGXIA

CREATION OF THE JOINT VENTURE

As one of the largest and fastest growing industrial economies in the world, and the world's fastest growing consumer of aluminum, China is a particularly attractive market for aluminum producers. China has over 100 aluminum smelters most of which are small in scale. The government has adopted a policy to shut down small scale Söderberg smelters by 2007 thus tightening supply, and reducing environmental and health concerns.

Prior to Alcan Ningxia, Alcan's presence in China included an extrusion and fabrication plant, four fabricated parts plants and an aluminum composite panel plant.





The Alcan Ningxia joint venture dates back to an agreement finalized in early 2004, whereby Alcan invested approximately US\$150 million for 50% participation and a secure coal-fired power supply in an existing 150 kt/y (*kilo tons per year*) modern pre-bake smelter, located in the Ningxia autonomous region of the Peoples' Republic of China. The smelter had been in operation since 2001, along with an accompanying anode plant that began production in 2000. Although modern assets were in place, a major effort was required to bring EHS management practices up to Alcan's standards. Adjacent to the Alcan joint venture, there is another older smelter which continues to operate.

Investing in the Ningxia joint venture was a strategic business move to enhance Alcan's position in the world's fastest growing economy and the world's second largest consumer of unwrought aluminum. The investment also ensures long-term access to dedicated power on competitive terms, sufficient to meet the energy requirements of the smelter. Alcan has a substantial operating role at Ningxia and the option to acquire, through additional investment, up to 80% of a new 250 kt/y potline already under construction.

Alcan was attracted by the new plant and its progressive leadership. For its part, Alcan offered both management skills and alumina, then in short supply in China.

Mr. Gomes commented on the remoteness of the facility:

It's not too far from the truth, that almost everyone is local except the three or four expatriates. It's very difficult to hire people, but also to lose people, as mobility is very low and nearly all employees have lived here most of their lives. Ningxia is quite a remote place, a desert and not very appealing for the Chinese people. But it is appealing to the expatriates for the adventure, growth and learning.

As for performance, in 2004, the facility had, for China, the lowest current efficiency (highest level of electricity per kg of aluminum produced) among comparable facilities.

MANAGEMENT OF THE JOINT VENTURE

The management group at Ningxia is a mix of foreign and local managers. The CEO of the Joint Venture, Mr. Gomes, is Brazilian. Besides the CEO, there are two expatriate managers, the CTO (Chief Technical Officer) who is Canadian and the CFO who is British. The management team has six directors, four of whom are local and 16 managers and supervisors who are Chinese. The facility's organization chart is presented in Exhibit 5.

In 2004, the plant had 1,300 employees, most under the age of 40, of which 30% were contractors. The Chinese government favors unions and Alcan elected to allow the Ningxia employees to unionize.



THE CHALLENGE OF IMPLEMENTING EHS FIRST AT NINGXIA

The EHS challenges were substantial. Only rudimentary EHS management was in place when Alcan became involved in the Ningxia operation. At the beginning of the joint venture, safety was seen as an issue only for the safety department. According to Mr. Gomes, "The initial attitude was, 'In China we talk about production, while you (Alcan) talk about safety'."

As for the mandatory GAP Analysis of EHS at the new joint venture, according to Mr. Gomes, "it wasn't complicated: everything had to be done."

Challenges in this area included:



No EHS culture/values before implementation of the joint venture.

Lack of an environment management and monitoring system.

Lack of a health management system and an incomplete safety management system.

Lack of basic personal protective equipment, such as safety glasses and proper respiratory protection.

Lack of plant air conditioning or cool water in the workshops, and very poor canteen services.

Mr. Gomes commented on the EHS and cultural challenges facing him when the joint venture began:

There was no surveillance at the plant and at one point a child was found wandering inside. Everything was dangerous. There was little personal protective equipment. Managers toured the plant wearing neither safety glasses nor boots. The employees only cared about production. They worked in confined spaces and other dangerous situations with little regard for safety. Further, records of illness and injury were not kept. Paradoxically, the records indicated a plant without accidents. In the beginning, I confess I panicked. It was hard to sleep well. I probably spent 50% of my time on EHS issues. Now I reckon I spend 20%.

The EHS challenges were compounded by significant cross-cultural differences. We were in an area of China where the people had very little exposure to Western business practices. For example, the Chinese managers took longer to make decisions and seldom used the word "No" as they attempted to save face for both sides. Getting the workers to implement Alcan's EHS FIRST policies required not just an acceptance of new tasks but an acceptance of new values which in many cases were very foreign.

Absenteeism is below 0.5%, Chinese ethics at work is completely different from what we're generally used to, work is a value for them, at least here in this region it's almost a shame and loss of face to miss work. It's really another planet!

The facility was not certified under either ISO 14001 or OHSAS 18001 standards.



MANAGING CONTRACTORS, A PARTICULAR CHALLENGE FOR EHS

Contract employees were a particular challenge as existing EHS conduct by contractors was particularly poor. Contractors have traditionally provided hard manual labor, or have been involved with construction or other special projects. The challenge is exacerbated given that many of the employees working for the contractors were migrant workers from other parts of China and were often poorly paid and exploited. There is a high turnover rate amongst the contractors thus any training may be seen as a loss when contractors quit their job. Not surprisingly, injury rates were much higher for contractors.

Mr. Gomes commented on some of the problems initially encountered with contractors:

The problems we had with the contractors were the same ones we had with all our employees in the beginning, to make them understand that their safety is our first priority and not the speed at which they can do a project. All contractors are required to conduct a hazard identification and risk assessment prior to beginning work and are monitored and receive feedback on their EHS performance. As we're now almost always using the same contractors, it's much easier. They know us and what we stand for.

By 2006, 2.5% of the plant's 1,300 employees were contractors.

FIRST STEPS TOWARDS EHS FIRST AT THE JOINT VENTURE



Actions to enhance EHS standards at Ningxia Works began before the joint venture was finalized. A special EHS group was formed in Canada and all materials related to the *EHS FIRST* management system were translated into Mandarin by local employees familiar with operations and local culture. The group immediately started working with Ningxia employees, realizing that Alcan had to advance rapidly to implement its *EHS FIRST* directives. Ningxia's top local managers were sent to the Saguenay Quebec plant to familiarize themselves with Alcan leadership and *EHS FIRST* best practices. Managers received training in the causes, effects and control of loss, in EHS performance indicators and the importance of measurement, in communication and coaching, and in change management.

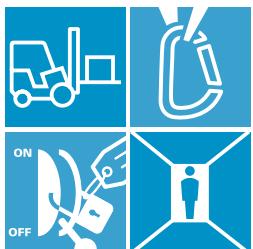
First, an EHS department was set up. The current EHS Director, Liu Liping, is an engineer who worked at the anode facility and had no previous direct EH&S experience. He has three supervisors who report to him specializing in environment, health and safety, respectively.

An EHS committee was established comprising all the senior local managers including Mr. Gomes and Mr. Liping. The EHS committee meets every week and tours the facility. This tour generates a report by Mr. Gomes detailing all actions to be taken. The top local managers are responsible for implementing corrective measures and are supposed to reply with corrective actions (taken or plans to take them) during the same week. The minutes from a recent EHS committee meeting is presented in Exhibit 6.



Mr. Gomes commented on the steps taken to implement EHS FIRST:

The first step was to initiate an action plan based on a GAP checklist in critical areas for EHS FIRST performance improvement. EHS FIRST objectives were established and systems were introduced to collect EHS data and monitor and measure the site's EHS performance on a regular basis. Since enthusiastic acceptance by plant managers and employees was a critical success factor, the training department made sure employees understood the need for EHS FIRST and the important role that each and every employee plays in implementing the system. For instance in training the employees we emphasized behavior-based safety (BBS) and reviewed substandard acts and practices that lead to accidents. Employees were also trained in reporting accidents and measuring EHS FIRST performance with EHS metrics.



We concentrated on the five top threats — mobile equipment, working at heights, confined spaces, hazardous energy control, and equipment failure. They were really critical around here, both in the plant and in the community. So we put a lot of effort, first of all, on mobile equipment. It was a nightmare. Then on lifting equipment, and confined spaces. There had been a multiple-fatality confined space incident just across the fence, in our partner's plant.

One of the first behavioral initiatives was to instill a fundamental regard for individual life. As a result of a strong sense of the collectivity, individuality and individual life was valued differently than in Western cultures. There were many traffic-related injuries and deaths in neighboring facilities and in the general community. We began to ask employees for a moment's silence after such incidents. Such gestures helped to develop a concern for the well being of others in both the workforce and community.

Among the early and most basic actions were: distributing proper personal protection equipment and training in its use, making cool water available on the shop floor, and improving the canteen, air conditioning and washrooms. Pedestrian and mobile equipment safety was improved and “lock-out, tag-out” introduced.

Procedures for accident and incident investigation were initiated. Before the joint venture was created, only lost-time incidents were reported. Now both these and near-misses are reported and investigated. An example Mr. Gomes gave was of a truck that hit a pole in the snow. Although no one was hurt, the driver reported the incident to the EHS service. “They report incidents even when no supervisor is present,” says Mr. Gomes. “Sometimes it seems as if the lesson has penetrated too deeply. When a woman fainted at work, EHS staff asked headquarters in Montreal (Canada) if the case should be reported.”

Modifying the attitude and behavior of all plant personnel was considered a key step in meeting the challenge in an operating environment where individual line managers considered EHS a “safety department job.” This involved extensive communication and feedback between managers and employees. Line managers are expected to “own” the process of EHS and to enable their employees to play a meaningful and active role in the process. Managers are accountable for making sure that everyone in their workplace shares the knowledge of EHS procedures, processes, work practices and potential hazards and the rewards associated with continual improvement in EHS.

Mr. Gomes recalls:

We immediately increased EHS FIRST training with a focus on behavioral/accident prevention processes. Numerous initiatives were undertaken to improve the safety of the physical plant such as fencing the facility and redesigning entrances to keep pedestrians away from moving equipment. At first, changes came from the top down. Employees followed directions but did not make suggestions on health and safety. But more and more suggestions have come from employees. For example, an employee alerted him to the danger he faced in inspecting the plant with his jacket open.



Alcan Ningxia provided a total of 59,356 person-hours of EHS training in 2004 and 72,394 hours in 2005.

In part to support the local hospital, and in part to follow the Chinese pattern of providing occupational health services through the community health care network, Alcan opted to use and augment the local community hospital. An ambulance was acquired for the plant as well as an automatic heart defibrillator. In addition, a nurse and a physiotherapist (a profession largely unknown in China) were hired. Screening for hearing loss and pulmonary decline, which are part of the normal follow-up for all Alcan smelter employees, were performed at the local hospital. Alcan augmented the local hospital staff by bringing in a western physician.



Noting that the surrounding community was facing a number of serious health and safety issues, Alcan commenced a number of community involvement projects as they have in many of their other facilities. The lack of basic rules for traffic safety was the likely impetus for a very high number of accidents and fatalities, while poor hygiene practices and lack of awareness were resulting in community health issues. These community involvement projects included the following initiatives which are further detailed in Exhibit 9:

- Sharing medical expertise and improving hospital hygiene standards.
- Campaign against trachoma (leading cause of preventable blindness) and achieving a 50% reduction of this serious disease.
- Promoting bird flu awareness.
- Promoting traffic safety.
- Promoting “no drink and drive” campaign in the restaurants and bars.
- Helping children improve English learning.
- Providing relief for poor southern Ningxia residents stricken by severe drought.
- Reducing poverty in Ningxia through micro-finance and donations.
- Organizing campaign to send 25 poor local students to university.



On the environmental front, local emission standards for the baking furnace (including PAHs, particulates, and fluorides) were deemed to be unacceptable to Alcan. A team of Alcan experts provided more than 40 recommendations to improve the furnace’s operation and eliminate frequent fires.

According to Mr. Gomes:

While China does have tough environmental regulations, enforcement is deficient. However, environmental concerns are now permeating central government policy — the 11th 5-year plan incorporates the reduction of energy consumption by 20% per unit gross domestic product. This reinforcement of the importance of the environment by the central government has given a boost to Alcan’s case for environmental stewardship with its partner QTX.



EHS RESULTS



Exhibits 7 and 8 summarize improvements in health and safety following the introduction of *EHS FIRST*. Other important results include:

- By the end of 2005, Alcan Ningxia received triple certification for ISO 14001, OHSAS 18001, and ISO 9001. This was accomplished in a record time of 11 months, an unprecedented achievement within Alcan. Alcan Ningxia is also the only smelter in China to have achieved triple certification, as well as being one of only 100 companies in the country similarly certified.
- Alcan Ningxia completed 3.2 million hours without a lost time accident and also an unprecedented 2.2 million hours without a recordable accident, never before achieved in Alcan's Primary Metal Group.
- Surpassing safety performance targets by more than 50%. While no reliable safety data was available before the start of the joint venture, benchmark data was established for the second half of 2004 that included a Recordable Case Rate of 0.81 and a Lost-Time Injury/Illness (LTII) rate of 0.55.
- The Long Term Illness And Injury (LTII) rate dropped by 45% in 2005 to 0.3. The Recordable Case Rate increased by 8% to 0.89, though this is actually viewed as a positive indication that the reporting of events has taken on a greater importance among all personnel.
- Changes made to the baking furnace operation have dramatically reduced both the frequency and extent of fires. Process adjustments to the anode-baking furnace also resulted in significant reductions in atmospheric releases. In two test samples, PAH emissions fell from a range of 95-180mg/Nm³ to 20-40 mg/Nm³. These results are now well below the local standard of 50 mg/Nm³.

2007 EHS FIRST PRIORITIES

Mr. Gomes is currently reviewing his *EHS FIRST* priorities for 2007 which include:

Implementing an accident prevention initiative, by training 100 specialized observers and carrying out 6,500 observations during the year, with a target to record specific safety-related behaviors for more than 50% of all employees every month.

Improving two critical safety concerns — Hazardous Energy Control and Working at Heights.

Fully implement Alcan's standards for measuring atmospheric releases.

Installing a modern dry scrubber to reduce emissions from the anode baking operations, one of the first in China.

These targets have been communicated in general meetings and their attainment is incorporated in employees' bonuses. Progress towards the targets is reviewed monthly.



RESPONSE

TO MR. XIAOPING'S ACCIDENT

In the three months leading up to Mr. Xiaoping's accident, the plant had been stretched to meet aggressive production targets. Similar aggressive targets exist for the coming three months.



When notified of the accident, Mr. Gomes instructed a team of operators, supervisors and Mr. Liping to investigate the accident. Their initial investigation identified the primary causes of the accident to be:

1. *Wagons did not contain a safety device (such as a bumper) that would deflect energy from the operator in case of impact between two wagons.*
2. *The wagon pushers were primarily employees working for a subcontractor. These workers were often inexperienced and untrained.*
3. *The combined pedestrian and vehicular entrance would often become congested forcing wagon pushers to try to move too quickly. This congestion was worsened by the recent production surge.*
4. *Wagon pushers could not clearly see the presence of the wagon pushers in front of them.*

The team said they would study the situation and come up with recommendations to prevent future occurrences. However, when asked by Mr. Gomes what they would do until a solution could be implemented they responded "we would be more careful".

One interim solution would be to require a 50 foot minimum distance between wagons until a permanent solution can be found. However, such a solution would reduce input of alumina into the smelter.

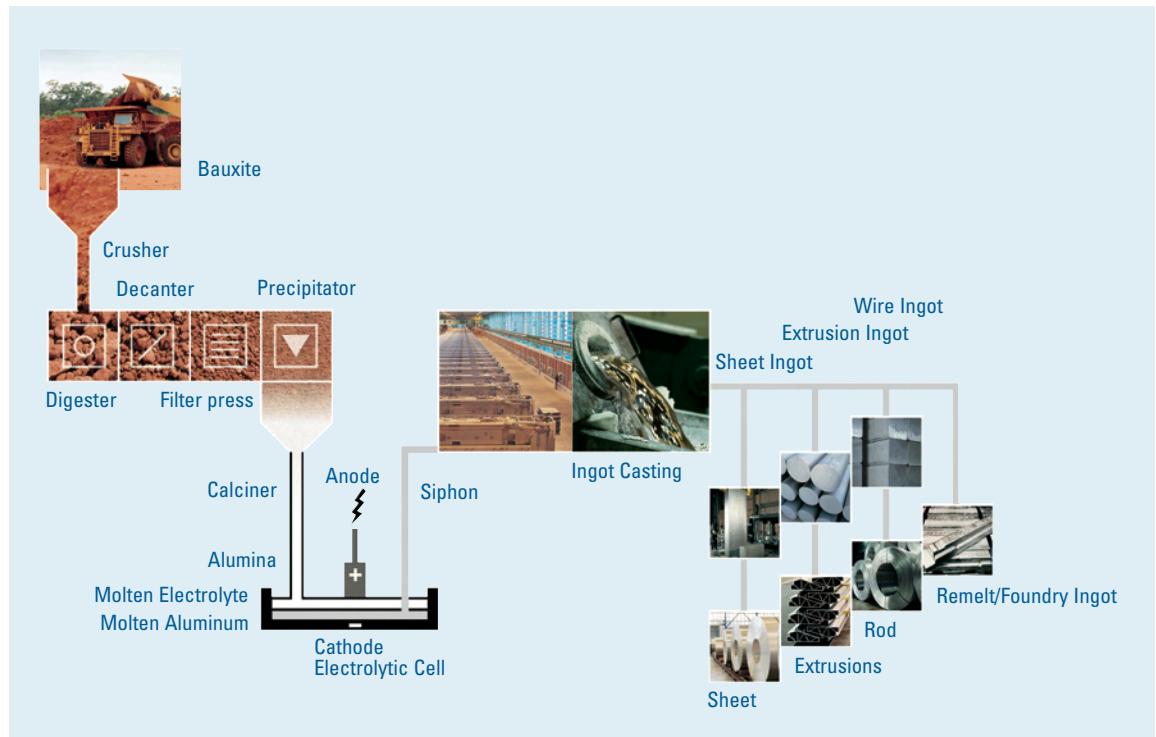


CASE QUESTIONS

1. What are the competing priorities faced by Mr. Gomes? Given these priorities, what enabled EHS to be first? What were some of the challenges in implementing *EHS FIRST* at this location and how were they overcome?
2. Who are Alcan's primary and secondary stakeholders? What are their stakes in EHS? What opportunities and challenges do the stakeholders present to Alcan? What responsibilities (economic, legal, ethical and philanthropic) does Alcan have to its stakeholders? Has its actions as described in this business case been in line with corporate social responsibility, corporate responsiveness and corporate social performance? Please explain.
3. What does the case of Yang Xiaoping say about the advantages and disadvantages of employing contractors for manual, hazardous, or even specialized jobs? What should the CEO do in the aftermath of Mr. Xiaoping's accident? What actions have already taken place to reduce similar accidents?
4. What is the Alcan's rationale for implementing *EHS FIRST*? What are the economically measurable benefits from *EHS FIRST*? Was this a good return on investment? What are the non-economic benefits? Does the data support Alcan's efforts? Does the data support Alcan Ningxia's efforts?
5. Is there a trade-off between productivity and safety over the long term?
6. Referring to international staffing theory what approach to staffing, management practices and EHS programs did Alcan take? What were the gains and losses of these approaches?



EXHIBIT 1: ALUMINUM PROCESS FLOW



Source: The International Aluminium Institute



EXHIBIT 2: INTERNATIONAL ALUMINIUM INSTITUTE VOLUNTARY OBJECTIVES

VOLUNTARY OBJECTIVE 1

An 80% reduction in perfluorocarbon (PFC) greenhouse gas emissions for the Industry as a whole per tonne of aluminum produced by 2010 versus 1990.

VOLUNTARY OBJECTIVE 2

A minimum 33% reduction in fluoride emissions for the Industry as a whole per tonne of aluminum produced by 2010 versus 1990.

VOLUNTARY OBJECTIVE 3

A 10% reduction in smelting energy usage for the Industry as a whole per tonne of aluminum produced by 2010 versus 1990.

VOLUNTARY OBJECTIVE 4

A 50% reduction in the 'Lost Time Accident Rate' and 'Recordable Accident Rate' for the Industry as a whole by 2010 versus 2000.

VOLUNTARY OBJECTIVE 5

Implementation of Management Systems for Environment (including ISO 14000 or equivalent certification) and for Health and Safety in 95% of Member Company plants by 2010.

VOLUNTARY OBJECTIVE 6

Implementation of an Employee Exposure Assessment and Medical Surveillance Programme in 95% of Member Company plants by 2010.

VOLUNTARY OBJECTIVE 7

The Industry will monitor annually aluminum shipments for use in transport, to track aluminum's contribution, through light-weighting, to a reduction in greenhouse gas (GHG) emissions from road, rail and sea transport.

VOLUNTARY OBJECTIVE 8

The IAI has developed a mass flow model to identify future recycling flows. The industry will report annually on its global recycling performance.

VOLUNTARY OBJECTIVE 9

The IAI Member Companies will seek to reduce their fresh water consumption per tonne of aluminum produced and will report annually on progress.

VOLUNTARY OBJECTIVE 10

The IAI Member Companies will seek to reduce their fresh water consumption per tonne alumina produced and will report annually on progress. IAI Member Companies will concentrate efforts to minimize fresh water consumption where there are limited available fresh water resources.

VOLUNTARY OBJECTIVE 11

The IAI Member Companies will seek to reduce GHG emissions from the production of alumina per tonne of alumina produced.

VOLUNTARY OBJECTIVE 12

The IAI Member Companies will seek to continue to increase the proportion of bauxite mining land rehabilitated annually; IAI will report annually on the proportion of area rehabilitated to area mined.



EXHIBIT 3: EHS GAP ANALYSIS TEMPLATE

Site Summary					Close Report
Topic Specific Gap Analysis Protocols	Total # of Checklist Statements in Protocol	Responses tally (count) & percentages from the			Implementation (%)
		Just Started #	In Progress #	Implemented #	
1.3 Leadership's commitment to EHS Excellence	6				
2.0 Protocol for Alcan's shared Values, Code of Employee and Business Conduct	5				
3.1 Creating a World Class EHS Organization	8				
3.3 Legal and Other EHS Requirements	5				
3.4 EHS Objectives and Targets	11				
4.1.1 Roles and Responsibilities	8				
4.1.2 Communications	8				
Total	51	0	0	0	
Gap Analysis Site Snapshot - PROCESS REQUIREMENTS					
Topic Specific Gap Analysis Protocols	Total # of Checklist Statements in Protocol	Responses tally (count) & percentages from the			Implementation (%)
		Just Started #	In Progress #	Implemented #	
3.2 Identification of Environmental Aspects and Health & Safety Hazards, Risk Assessments	13				
3.5 EHS Management Programs	5				
4.1.3 Training and Development	13				
4.3 Standard Operating Procedures	11				
5.1 EHS Performance Monitoring and Measuring	4				
5.2 EHS Event Classification, Investigation and Analysis Process	10				
5.3 Non-conformances, Preventative and Corrective Action Process	10				
5.5 Audit Systems	10				
6.1 EHS Management Review & 6.2 Annual Assessment	5				
Total	81	0	0	0	



EXHIBIT 4: ALCAN SUSTAINABILITY REPORT — PERFORMANCE DATA SUMMARY

Economic
EHS FIRST
Community Investment

Additional data on www.alcan.com/SR06/Data

	2003	2004	2005
AVERAGE NUMBER OF EMPLOYEES (in thousands) ^{1,2}	47	82	63
CAPITAL EXPENDITURES AND BUSINESS ACQUISITIONS (in millions of US\$) ^{1,2}	4,657	1,735	1,854
PAYROLL/BENEFITS (in millions of US\$, including Pechiney starting 2005) ^{2,3}	2,783	3,314	4,232
INCOME TAXES PAID (in millions of US\$) ^{1,2}	230	546	74
OPERATING WORKING CAPITAL (in millions of US\$) ^{1,2}	2,458	2,380	1,380
CAPITAL ASSETS AND GOODWILL (NET) (in millions of US\$) ^{1,2}	20,006	20,020	16,759
TOTAL ASSETS AS AT DECEMBER 31 (in billions of US\$) ¹	31.9	33.3	26.6
TOTAL DEBT (in millions of US\$) ¹	9,542	9,400	6,415
PREFERENCE SHARES (in millions of US\$) ¹	160	160	160
COMMON SHAREHOLDERS' EQUITY (in millions of US\$) ¹	10,117	10,566	9,484
BUSINESS GROUP PROFIT (BGP) for Alcan's business groups (in millions of US\$) ¹	2,030	3,611	3,184
RETURN ON CAPITAL EMPLOYED (in %) ^{1,2}	5	5	6.7
RESEARCH AND DEVELOPMENT EXPENSES (in millions of US\$) ¹	190	239	227
ENVIRONMENTAL PROTECTION financial requirements (in millions of US\$) ¹	263	254	229
CUMULATIVE TOTAL RETURN based upon an initial investment of \$100 on December 31, 2000 with dividends reinvested (in US\$)	145	153	146
TOTAL ENERGY CONSUMED BY ALCAN'S INSTALLATIONS excluding efficiency of energy generation (in millions of GJ)	237	339	281
TOTAL ENERGY CONSUMPTION RATE (in GJ/US\$ sales)	0.017	0.014	0.014
HISTORICAL ENERGY CONSUMPTION AT ALCAN SMELTERS (in kWh/kg aluminum)	15.2	14.9	14.5
TONNES OF CO ₂ EQUIVALENT (per thousand US\$ sales)	1.57	1.66	1.63
ABSOLUTE GHG EMISSIONS (in millions of tonnes of CO ₂ equivalent)	21.8	41.2	33.1
GHG EMISSIONS FROM ALUMINA HYDRATE PRODUCTION (in tonnes of CO ₂ equivalent per tonne of alumina hydrate)	1.02	0.86	0.89
GHG EMISSIONS FROM ALUMINUM PRODUCTION (in tonnes of CO ₂ equivalent per tonne of hot metal produced)	4.6	6.2	5.7
PFC EMISSIONS (in tonnes of CO ₂ equivalent per tonne of hot metal produced)	1.1	1.6	1.1
TOTAL WATER USE (in millions of m ³)	177.8	254.8	267
TOTAL WATER USE RATE (in millions of m ³ per million of US\$ sales)	0.0128	0.0131	0.0131
MINED AREA REHABILITATED (in hectares)	—	26	40
MINED AREA REHABILITATED RATE (in hectares rehabilitated per hectares mined)	—	0.12	0.29
OHSAS 18001 CERTIFICATION (sites registered in %)	44	53	88
DAYS LOST RATE (per 200,000 hours worked)	55.87	50.42	22.49
RECORDABLE CASE RATE (per 200,000 hours worked)	2.83	1.79	1.5
LOST TIME INJURY/ILLNESS RATE (per 200,000 hours worked)	0.88	0.68	0.54
NUMBER OF FATALITIES	2	4	0
NUMBER OF FATALITIES RATE (per million hours worked)	0.021	0.021	0
ISO 14001 CERTIFICATION (sites registered in %)	60	60	90
ENVIRONMENTAL EVENTS (total number of major events)	0	0	0
PRIMARY METAL PAH EMISSIONS RATE (Söderberg smelters only) (in kilograms per tonne of hot metal produced)	0.98	0.91	0.73
PACKAGING VOC EMISSIONS RATE (in tonnes per million US\$ packaging sales)	9.11	6.19	6.23
PRIMARY METAL PARTICULATE MATTER EMISSIONS RATE – SMELTERS ONLY (in kilograms per tonne of hot metal produced)	3.78	3.39	2.74
PRIMARY METAL FLUORIDE EMISSIONS RATE (in kilograms per tonne of hot metal produced)	1.68	1.41	0.94
SO ₂ EMISSIONS (in thousand of tonnes)	102.4	123.2	113.4
TOTAL HAZARDOUS WASTE RATE (in tonnes of hazardous waste per million US\$ sales)	7.71	6.77	4.68
TOTAL NON-HAZARDOUS WASTE RATE (in tonnes of non-hazardous waste per million US\$ sales)	67.56	37.32	38.95
GENERATED SPENT POTLINING RATE (in kilograms per tonne of hot metal produced)	22.4	26.2	24.3
BAUXITE RESIDUE RATE (in tonnes of bauxite residue per tonne of alumina hydrate produced)	0.71	0.79	0.65
CANADIAN DONATIONS AND SPONSORSHIPS (in millions of CANS)	5	9.4	8.6
DONATIONS AND SPONSORSHIPS WORLDWIDE (in millions of CANS)	8.5	13.1	12.7

¹ On January 6, 2005, Alcan completed the spin-off of Novelis to its shareholders. Novelis consists of substantially all of the aluminum rolled products businesses held by Alcan prior to its 2003 acquisition of Pechiney, together with some of Alcan's alumina and primary metal-related businesses in Brazil, which are fully integrated with the rolled products operations there, as well as four former Pechiney rolling facilities in Europe. The financial information presented for 2004 and previous years includes Novelis.

² Excludes data from businesses held for sale and discontinued operations.

³ Data for 2005 does not include Novelis data while data for 2004 and 2003 includes a small portion of Novelis (former Alcan plants), but does not include data for the plants transferred to Novelis that were former Pechiney plants.



EXHIBIT 5: ORGANIZATION CHART, ALCAN NINGXIA

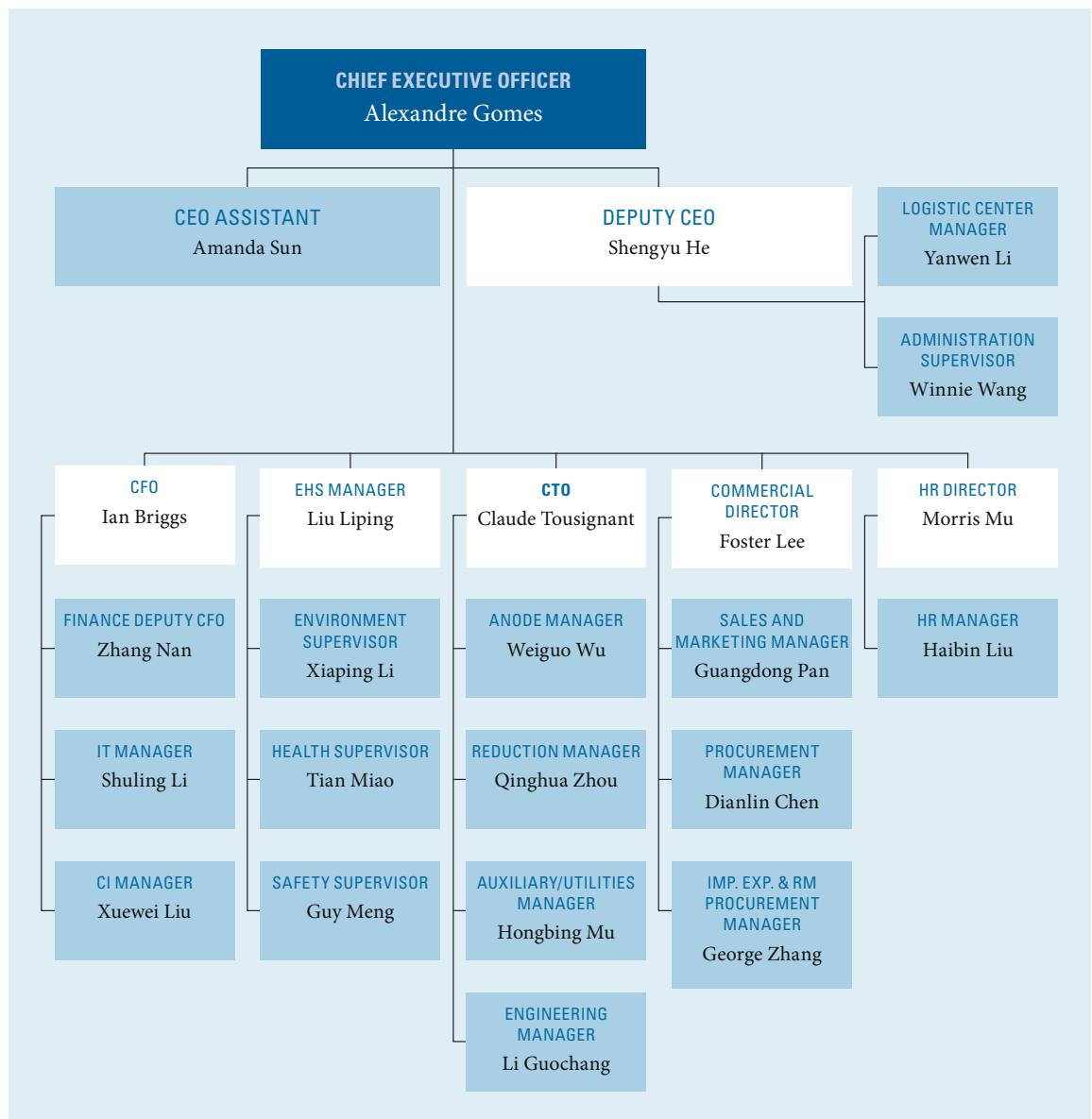




EXHIBIT 6: NOTES FROM RECENT *EHS FIRST* COMMITTEE MEETING

MEMORANDUM

From: Alexandre Gomes
To: *EHS FIRST* Committee
Re: Minutes Of February 5, 2007 Meeting
Date: February 6, 2007

Training:

- Claude/Alex/Morris/Foster and local senior managers to be at the opening of the training on May 30 @ 8:30am to support the observers and show everyone how important the observers work is for what we're achieving.
- Claude to have this discussion with his managers to make sure everyone is on the same page, we can not afford to lose momentum on that.
- Claude to ask them, prior to their Monday meeting, for their best observers, one per department, that will be recognized in each monthly performance meeting. I still think of a "Ping An Jia Ning" medal as a good symbol to be given to the best observers similar to the Olympic mascots that now are being given as very especial gifts prior to the 2008 games.

Fume Treatment Center Project:

- Foster/Claude to meet Guochang to get a thorough debriefing of his meeting with environmental authorities.
- Foster to meet the environmental authorities with Guochang to try to have their consent (for 12 months instead of 8 months) in writing. If he doesn't succeed, he will propose Claude/Alex/Foster will go see them to make a presentation.
- Claude to prepare a convincing but short material to presentation to environmental authorities, about our FTC project (photos, measurements, etc).

5th Transformer/Rectifier Group:

- Claude to check with Pierre, or whomever, whether we can profit from Cameroon's similar project, so we can save time and move this important project forward.

Houses Maintenance:

- Claude to meet Guochang to make a plan to improve them.

Chinese Training:

- Morris to check what can be done for the next "wave of lao wai" (strangers).

Other Subjects:

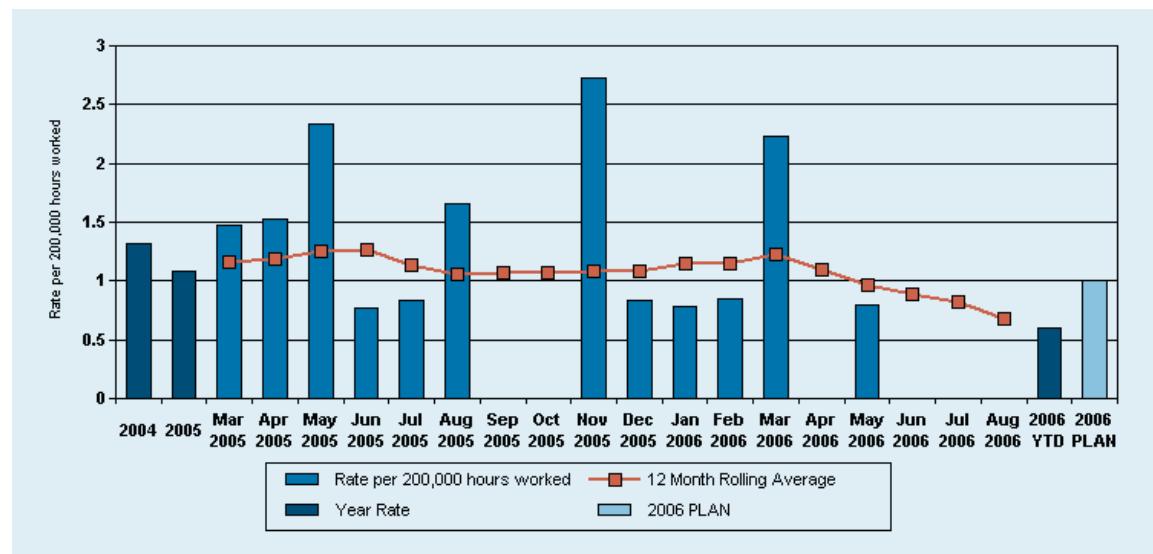
- To keep this short I won't repeat the ongoing subjects; please refer to them in previous mails.



EXHIBIT 7: RECORDABLE CASE RATE AND LTII CASE RATE (NINGXIA)

RECORDABLE CASE RATE — AIRS TOTAL, NINGXIA

SITES OPERATING $\geq 50\%$ OR MANAGED IN ANY MONTH BETWEEN 01.2006 AND 08.2006
DATA FOR ALCAN OPERATING PERIODS ONLY



LTII CASE RATE — AIRS TOTAL, NINGXIA

SITES OPERATING $\geq 50\%$ OR MANAGED IN ANY MONTH BETWEEN 01.2006 AND 08.2006
DATA FOR ALCAN OPERATING PERIODS ONLY

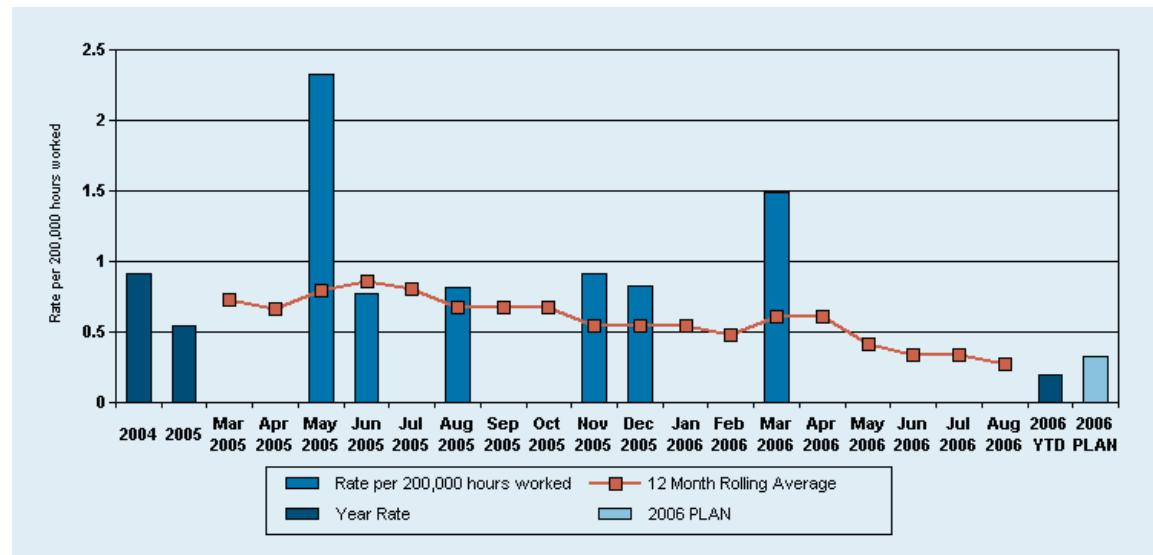
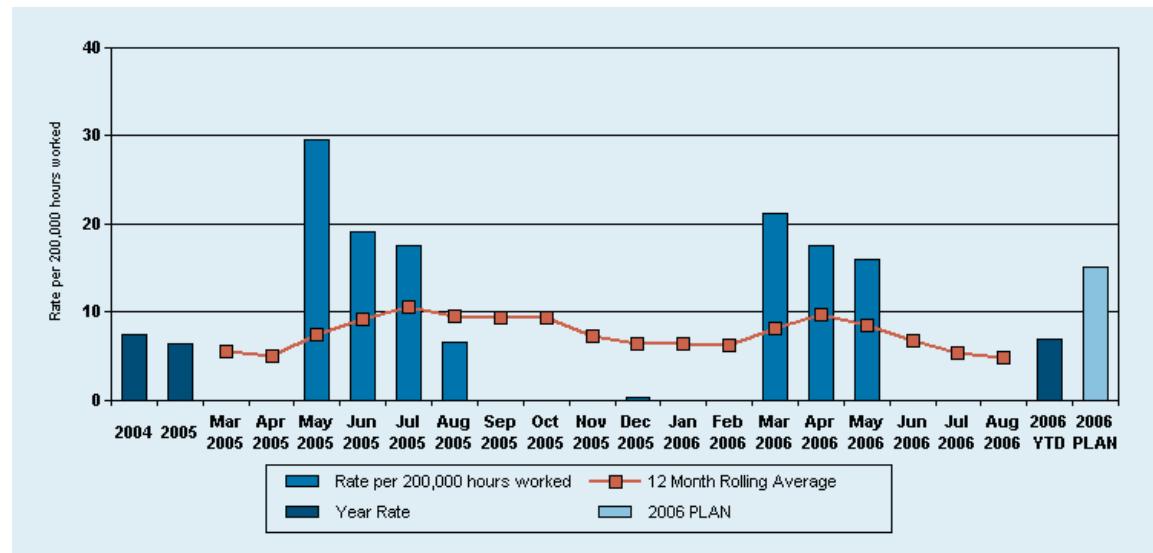




EXHIBIT 8: DAYS LOST RATE AND SERIOUS INJURIES CASE RATE (NINGXIA)

DAYS LOST RATE — AIRS TOTAL, NINGXIA

SITES OPERATING $\geq 50\%$ OR MANAGED IN ANY MONTH BETWEEN 01.2006 AND 08.2006
DATA FOR ALCAN OPERATING PERIODS ONLY



SERIOUS INJURY CASE RATE — AIRS TOTAL, NINGXIA

SITES OPERATING $\geq 50\%$ OR MANAGED IN ANY MONTH BETWEEN 01.2006 AND 08.2006
DATA FOR ALCAN OPERATING PERIODS ONLY

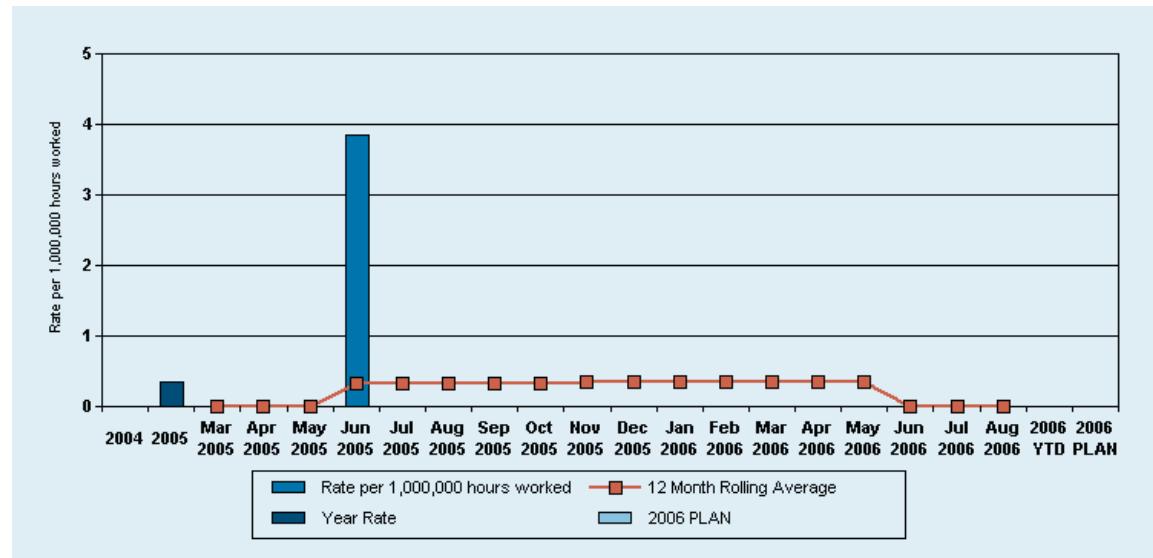




EXHIBIT 9: SUMMARY OF ALCAN NINGXIA COMMUNITY INVOLVEMENT PROJECTS (2004-2006)

1. SHARING MEDICAL EXPERTISE

Through the efforts of Alcan's medical doctor, a number of basic needs were identified for health information and education at the local hospital. Various initiatives were organized to improve hygiene standards and practices, including education on simple preventive measures such as washing hands frequently during daily rounds and educating staff about potential sources of infection in the hospital. Alcan Ningxia also started supplying soap, towels and garbage bins for proper disposal of medical waste. New equipment like dentist chair, maternity bed, ORL chairs and others were donated to the hospital, which improved the service to the community. A very favorable article about this contribution (attachment 1) was published in one of the most read provincial newspapers, even comparing our doctor to Dr. Bethune, after the famous Canadian doctor (actually a national hero in China) that worked so hard to the Chinese people in the thirties.

2. CAMPAIGN AGAINST TRACHOMA AND ACHIEVING A 50% REDUCTION OF THIS SERIOUS DISEASE

For a second year, Alcan Ningxia campaigned in the community against trachoma, the world's leading cause of preventable blindness. It is a disease normally associated with poor hygiene conditions, compounded by dry, hot, and windy weather. Alcan Ningxia's involvement included presentations made in the plant, the community and local schools (over a 1,000 students attended the various presentations). The efforts paid off when data from the local hospital showed a reduction of 50% of Trachoma cases in April 2006, when compared to April 2005, normally the worst month due to sand storms.

3. PROMOTING BIRD FLU AWARENESS

Alcan Ningxia pioneered and took the lead in a bird flu awareness campaign in the surrounding community of Qingtongxia. Throughout 2005, presentations were made to over 1,000 students at the local school and more than 3,000 educational folders were distributed in the village and to outlying farms. Government authorities adopted Alcan's superior educational materials for their own use. The Company also distributed gloves during educational visits to local livestock markets. A very positive article (attachment 2) was posted in the Internet about Alcan Ningxia's contribution.



4. PROMOTING TRAFFIC SAFETY

In its first year, following a fatality in the community, we focused on bringing awareness to local authorities to the need of having a minimum police force to control the chaotic and very dangerous traffic in the community. As a result, a permanent police force was put on site, taking especial care to stop automobile traffic when thousands of people ride theirs bicycles at rush hours, improving a lot safety conditions for the bicycle riders. In the second year of campaigning in the community to improve traffic safety, Alcan Ningxia focused its 2005 efforts on motorcycle riding. Of particular concern was the low use of safety helmets, a frequent cause of death in traffic accidents. In a cooperative effort with its Chinese partner's employees, QTX's security department, and the local police, Alcan Ningxia met with many local motorcyclists to educate them about the importance of wearing helmets. As part of this campaign, Alcan Ningxia distributed 75 helmets to local residents free of charge.

5. PROMOTING "NO DRINK AND DRIVE" CAMPAIGN IN THE RESTAURANTS AND BARS

Knowing that many of the traffic accidents and fatalities happen after people leave bars and restaurants, we prepared an educational pamphlet with a lot of information about the deadly drink and drive combination and distributed in over 20 bars and restaurants in Qingtongxia. The discussions with the people were very lively, and even the restaurant owners were very happy for this contribution.

6. HELPING CHILDREN IMPROVE ENGLISH LEARNING

Learning English is one the strongest wishes of the local people, especially the children, but their access to good quality learning material is very limited. In order to fill that gap, we bought a number of high quality English books in Beijing and donated to the school for them to establish an English library, which was deeply appreciated. The donation ceremony was carried out in front of the school in the presence of the principal and teachers, with the expatriate children bringing the books and handing them to the school.

7. PROVIDING RELIEF FOR POOR SOUTHERN NINGXIA PEOPLE STRICKEN BY SEVERE DROUGHT

Contrary to the farmers around the Qingtongxia area, that have access to irrigation from the Yellow River, the farmers in the Southern region of Ningxia live at the mercy of the weather and depend heavily on rain for their crops. Their situation was then desperate in the beginning of 2005, when a severe drought hit the region. We then organized a donation campaign in the plant and the Company matched the same amount, providing an important contribution to alleviate those farmers' situation.



8. ALLEVIATING POVERTY IN NINGXIA THROUGH MICRO-FINANCE AND DONATIONS

Going beyond the community around the plant, we realized that the people living in QTX were actually privileged, comparing to severe poverty conditions in places like the Yanchi county and South of Ningxia.

People in the natural villages in the Yanchi county live in severe poverty conditions, many are in the middle of the desert with very difficult access to water and the most basic things we're used to have so easily. There we discovered a local NGO called CEPA, which does a marvelous job of poverty alleviation by means of micro-finance for women. The loans come together with technology transfer on how to raise pigs and sheep in an environmentally correct way, both by using the pig's manure to make gas for cooking, as well as keeping sheep enclosed and avoid over grazing, one of the important reasons for desertification in Ningxia. So far we have "adopted" one natural village, through grants for micro-finance, and are targeting much more. The NGO is very well managed, the loans are strictly controlled both by "loan officers" that work for CEPA, as well as the village "credit committees", which are run by the women of the own village. The loans are paid back with interest, and the experience has shown that close to 100% of the loans are duly paid and the standard of living of the villages is increasing. As an example, we met one man who proudly showed his pigsty, his new house and kitchen, as well as his old house in the back (now just a storage), before his wife joined the project. They now raise pigs and sheep in an environmentally friendly way. When we asked him what impact the micro-finance project had on his life, his quick answer was really moving, he said: "I'm a rich man now!" This project also has a significant impact on women's participation and status in the communities. Belonging to extremely patriarchal societies, where they must blindly obey their fathers, then their husbands and in-laws, this project is transforming their lives entirely, increasing their say in the community and their self esteem.

9. MAKING POOR STUDENTS UNIVERSITY DREAM COME TRUE

Every year millions of bright poor students succeed the extremely difficult entrance exams to the university, but as their families can not afford to send them to study they end up staying in the fields, wasting a big potential of improving their lives. They usually come from families that have a yearly revenue below RMB 1100 (US\$138), some even as low as RMB 500/year (US\$62). We organized a campaign in the plant for the employees to donate and Alcan Ningxia contributed to a total donation of RMB 100k (US\$12.5k). We were among the 12 top donors, and made it possible for 25 students to "make their university dream come true", as they publish it. The knock-on effect of these young people leaving the country side to a better life on their families' and their own future is quite significant. Yinchuan TV station came to Alcan Ningxia to interview us and broadcast it on prime time. The broadcast was very positive on our contribution.



ALCAN

Alcan Inc. is a leading global materials company, delivering high quality products and services worldwide. With world-class technology and operations in bauxite mining, alumina processing, primary metal smelting, power generation, aluminum fabrication, engineered solutions as well as flexible and specialty packaging today's Alcan is well positioned to meet and exceed its customers' needs. Alcan is represented by 68,000 employees, including its joint-ventures, in 61 countries and regions, and posted revenues of US\$23.6 billion in 2006. The Company has featured on the Dow Jones Sustainability Indexes consecutively since 2003.

McGILL UNIVERSITY'S DESAUTELS FACULTY OF MANAGEMENT

McGill University has been offering commerce courses for over 100 years. Known for its global outlook and the diversity of its faculty and student body, McGill's Desautels Faculty of Management has 80 professors teaching more than 3,200 students enrolled in its undergraduate, graduate and doctoral programs. The undergraduate BCom program attracts among the very best students in the country. A redesigned MBA program with an integrated management curriculum will be launched in September 2008. The Faculty also offers programs with other professional faculties at McGill and seminars and courses for working professionals.