



EDITO

In recent years, many investment projects have been undertaken to increase the capacity of aluminium production in response to strong global demand, and Fives Solios has actively participated in those projects. However, after this steady period of growth for the aluminium industry, 2008 has seen considerable fluctuations as a result of US financial crisis and consecutive economic slowdown of the Western countries.

Today, the economic situation worldwide will lead the major market players to reconsider their business models and future projects. During this coming period, Fives Solios will work with its clients in close collaboration and continue the development of innovative solutions coping with the new requirements of the market in terms of profitability, energy savings and environmental compliance.

Fives Solios is part of a large industrial engineering group, Fives, which gives Fives Solios the necessary stability and support for its strategic growth. We have been able to extend our international presence by opening new offices in Russia, India, Turkey, and Brazil. Furthermore Fives Solios will continue to invest in R&D projects to respond to the new challenges and needs of our clients.

For decades our strategy has always been driven by the confidence we have placed in the growth of the primary aluminium industry. There is no doubt that aluminium production will continue to increase significantly in the coming years following the rising demand in the developing countries. Fives Solios firmly believes that aluminium remains a metal of choice for achieving sustainable development in many applications.

We remain YOUR reliable partner for designing today YOUR plant of the future.

Jean-Claude SALAS,
Chief Executive Officer Fives Solios

The Fives Solios' international team, part of the successful start up for Sohar Aluminium

In 2008, Fives Solios successfully commissioned and started up the five turnkey plants in Oman for which it was awarded contracts by Sohar Aluminium in 2005 and 2006. This project is not only a technical success, but also the culmination of two years of collaboration between international teams.

From February 2008 to early 2009, key equipment at these plants went on line, on schedule and to the satisfaction of the operators. These include the Liquid Pitch Marine Terminal at the port facilities, the Green Anode Plant and the Fume Treatment Center at the carbon plant, the Gas Treatment Centers at the pot line, the Holding and Melting Furnaces and the Cooling Water System at the casthouse.

For more than two years, thousands of people worldwide spent millions of man-hours in engineering, fabrication, erection, commissioning and start up. The design was mainly carried out in France and the United Kingdom and some other European countries, whereas fabrication took place in various areas on the five continents.

Green anode plant



To achieve these outcomes, many people were involved at the various stages of these contracts implementation. They performed all the required tasks from the first basic engineering starting at the end of 2005 until the last fine tuning under operation in early 2009.

Indeed, many companies located in the GCC area, Bahrain, UAE and Oman, were selected for the fabrication of more than 7,000 tons of steel as well as for civil engineering work, mechanical and electrical installations on-site, thus bringing millions of working hours to the local workforce.



Fives Solios team

Furthermore, all Fives Solios' subcontractors involved in on-site activities have fully respected the Omanization rate, with an average close to 30% of Omani personnel included in their various teams. Moreover, the Fives Solios Site Management organisation, a 40 person team, was composed of Omani personnel as well as expatriates coming from Canada, England, France, India, Pakistan and South Africa. This Fives Solios team managed and supervised the activities of more than 1,500 people at the peak period. As a result of the diligence and constant awareness of every person within this Site Management Team, more than 5.3 million construction hours were achieved without any lost time injuries during almost two years.

Fives Solios has once again demonstrated its ability to manage large projects with multicultural teams while continuing to achieve excellence in terms of health, safety and environment

On top of its recognized capacity to supply reliable installations on schedule, with performance levels in line with customer expectations, Fives Solios has once again demonstrated its ability to manage large projects with multicultural teams while continuing to achieve excellence in terms of health, safety and environment. ■



Water cooling system



Fume treatment center

CONTRACTS

EMAL in UAE

EMAL Company has awarded Fives Solios with a turnkey contract for the Hot Bath Cooling and Processing Plant for its new smelter in the industrial zone of Taweelah Port in Abu Dhabi (UAE).



Bath processing unit's modules

This plant will be the largest in the world, with an initial capacity of 700,000 tons of aluminium. An expansion, for phase 2 at 1,400,000 tons per year is foreseen.

This contract consists of the engineering and supply of all equipment for:

- Hot crushing of the crust shovels and anodes butts cleaning bath,
- Cooling on a metallic pan conveyor,
- Processing in an airswept autogenous mill designed by Fives Solios.

The upstream part of the cooling bath will be connected to the GTC via a duct network for collecting fluorinated fumes to reduce the overall emissions of the smelter.

This order will implement CELSIOS, the Clean Bath Processing Solution, the latest technology for hot bath treatment developed by Fives Solios.

KITIMAT in Canada

In August 2008, Rio Tinto Alcan awarded Fives Solios with two contracts for the design and supply of two Gas Treatment Centers and the Fume Treatment Center for its Kitimat plant, in Canada. This includes the study for large modules preassembly. The Kitimat modernization project consists of upgrading the existing plant from Söderberg technology to prebake and of increasing the production capacity from 250,000 tpy to 400,000 tpy.

YUNNAN in China

Yunnan Aluminium has entrusted Fives Solios with a contract for the upgrade of an anode baking furnace's Firing and Control System. The contract includes the supply of:

- One set of continuous monoxide analyser (CO) coupled with a process control system,
- One central process control system which integrates innovative and state of the art technologies for process regulation and combustion control, baking data supervision and management.



Anode baking furnace firing system

Fives Solios & Qatalum: a close collaboration for a major project

In 2007, Qatalum, a consortium between Hydro Aluminium AS and Qatar Petroleum, a state-owned company, entrusted Fives Solios with several contracts for the supply of one of the largest aluminium smelters in the world. At the end of 2008, the construction of the plant reached 50% completion. Fives Solios commitments are meeting the customer's goal: to produce first metal during the last quarter of 2009.

Qatalum has chosen Fives Solios' innovative solutions to achieve its objectives in terms of environmental protection, safety and performance.

It includes two EPC contracts for the supply of:

- A High Capacity Green Anode Plant featuring several Fives Solios innovations such as RHODAX®, the Natural Dry Mix Solution, and IMC™, Intensive Mixing Cascade, along with XELIOS, the Anode Forming Solution serving the electrolysis, and EOLIOS, the Solution for a Clean Paste Plant, to reduce emissions,
- Four Gas Treatment

Centers equipped with YPRIOS, the double suction technology, and supplemented downstream by two sea water scrubbers for the desulphurisation of gases.

And three turnkey contracts for the supply of:

- One Fume Treatment Center on anode baking furnaces and our latest generation of Firing Equipment & Process Control System, HELIOS, the Safe and Clean solution for anode baking,
- Eleven Melting & Holding Furnaces along with two Water Cooling Systems for the casthouse,
- One Liquid Pitch Marine Terminal fitted with two 12,000 tons tanks.

Activity on site started at the beginning of 2008 with a peak period scheduled in March, 2009. Since the implementation of these contracts, the main challenge for Fives Solios is health and safety to prevent the occurrence of potentially

risky situations.

The second challenge faced is to deal with difficult weather conditions during summer time, with temperatures exceeding 50°C (120°F).

For structural fabrication and erection, partnerships have been established with local companies such as Ama in Bahrain, Petron in Dubai but also, Danem, Manco, Comsip, Debaj and Descon. Fives Solios had collaborated with some of them

During the peak period, we are expecting 2,500 people working for Fives Solios, covering more than ten nationalities

previously, for the execution of Alba line 5 and Sohar Aluminium.

The civil engineering works for the Gas

Treatment Centers and the Green Anode Plant, is carried out by a local company, Kettaneh. Moreover, Fives Engineering China is involved in the manufacture of some furnace parts.

At the end of 2008, approximately 7,000 tons of steel coming mainly from GCC countries and 1,500 tons of equipment had been delivered on site.

During the peak period in mid 2009, we are expecting 2,500 people working for Fives Solios, covering more than ten nationalities.

In order to meet our schedule, the first anode production is planned for August 2009, and the first Gas Treatment Center should be started-up on the 1st of September. The commissioning of the first set of furnaces is forecasted for June, in line with the first metal production schedule. ■

RUSAL - Cost and resource optimisation

In 2008, Fives Solios implemented the manufacture of the Vibrair filters for the Gas Treatment Centers for both the Taishet and Boguchany plants.

These contracts' design and detailed engineering were carried out by our Montreal office, and the procurement was managed by our French offices.

The offices achieved this high level of cooperation by using a new business management software called HARMONIOS, jointly developed by Fives Solios in France and Fives Solios in Montreal.

For the first time, all filters and central ducts will be manufactured in China through our engineering office in Shanghai, Fives Engineering.

At the beginning of October 2008, the first casings were successfully delivered on site.

HYDRO ALUMINIUM KARMOY

Fives Solios has completed the installation and start-up of a five-zone Coil Annealing Furnace at Hydro Aluminium's Karmoy smelter in Norway.

The technical solution proposed by Fives Solios integrates a Cooling System designed to improve productivity, and a proven hot bogie design. This furnace is electrically heated and homogenised heat flow is achieved using direct drive fans.

Fives Solios' process provides the best annealing results with low energy consumption on each coil.

Start-up of Firing Systems

Fives Solios has successfully started-up the Firing Equipment and Control Systems for:

- The two anode baking furnaces at the Vedanta Jharsuguda plant, in India,
- The refurbishment of bake oven 1 in Tomago, Australia,
- The anode baking furnace in St Jean de Maurienne, France,
- and the upgrade of the CO's modules at Fushun in China.

Commissioning of HULAMIN furnaces

The four furnaces supplied by Fives Solios to Hulam in for its Twin Roll Caster Project in South Africa went into production in mid 2008.

The contract consists of the turnkey supply of two Melting Furnaces and two Holding Furnaces, along with the associated casting launders, supplying metal to a continuous casting line.

These four new furnaces, each with a capacity of 37 tons, were supplied pre-assembled. They were manufactured in South Africa.



Gas Treatment Center

XELIOS, the Anode Forming Solution for today's Electrolysis

The anode formers are often the bottleneck of anode production, both in terms of performance (green anode density) and operating rate (green anode plant availability).

Today, smelters need anode formers which can efficiently compact green anodes on constant high quality in order to cope with high amperage electrolysis and low grade cokes, and which are highly reliable in order to keep the green anode plant running with a minimum of unscheduled outages.



Xelios new vibrocompacting machine

Based on its long experience in designing, supplying and commissioning vibrocompactors, Fives Solios has developed Xelios, its new generation of vibrocompacting machines tailored to the needs of today's electrolysis. For the production of high density anodes, it is fitted with high energy unbalanced weights, vacuum system and top back pressure. For equipment reliability, it has been re-designed through value engineering which leads to a lighter and simpler machine.

Industrial operation using Xelios will start on two smelters in 2009.

By developing innovative solutions, Fives Solios' objective is to design today the aluminium plants of the future.

FIVES SOLIOS GOOD NEWS FOR YOU, the newsletter of Fives Solios – Solios Environnement SA - 25-27 boulevard de la Paix 78100 Saint-Germain-en-Laye France - Phone: +33 (0)130 87 45 50 – Director of Publication: Jean-Claude Salas – Editor: Pascal Gautier – Editorial Committee: Stephen Augustine, Bernard Cloutier, Philippe Dumortier, Alain Lecorre, Sam-Philip Maliha, Hugues Vincent – Writers: Hélène Bachellerie, Fabienne Virieux – Thanks for their collaboration: Denis Fantin, Alain Lecorre, Nicolas Pauzin – Design: Les contrebandiers, TBWA – Execution: Twenty Five Lyon – Printing: TPI – Registration of copyright and ISSN: in progress. Printed in 1,000 numbers.

Fives Group increases its presence worldwide

For many years, Fives has set up representative offices in China, Indonesia, Vietnam, Mexico and Thailand. This presence was increased between 2006 and 2008 with new commercial offices in Russia, Japan, Turkey and Brazil. Additionally, the Group has developed manufacturing subsidiaries in both China and India.

Fives' objective is to strengthen its presence in strategic and B.R.I.C. countries to respond to future market requests relating to cost optimization and customer services.

Subsequently, when Fives Solios was awarded contracts by Rusal, the opening of an aluminium oriented office, Fives Solios Vostok, was the right answer to meet our customers' expectations. Nicolas Pauzin, the Managing Director of this subsidiary, answers three questions to help us to understand its objectives.

Where did the idea come from for setting up a subsidiary in Russia?

As part of the RUSAL contracts (Taishet and Boguchany) Fives Solios decided to create its Russian subsidiary, Fives Solios Vostok, to supervise the construction and the commissioning of the GTCs and FTCs.

Fives Solios benefited from the experience of Fives Stein Vostok, a subsidiary of Fives Stein in France. This other Fives company, which is involved in the steel industry, created its own Russian subsidiary in 2007.

What are the main objectives of Fives Solios Vostok?

Our first role is to manage the execution of the Russian supervision contracts by recruiting and managing all European and Russian supervisors, and by providing technical support for transportation, customs, site intervention, etc. Fives Solios Vostok can also provide assistance to simplify the tax and legal processes in Russia.

The second objective is to search for new purchasing opportunities in the local market for current and future projects, as well as to enable us to offer cost effective solutions to our customers.

Thanks to this subsidiary, Fives Solios demonstrated to Rusal its intention to have larger Russian presence and local services to accompany them all along the contracts execution

In recent years, the Russian market has become more attractive but at the same time more competitive for the supply of imported equipment without technical added value. As an example, Fives Stein Vostok has already

successfully manufactured in Russia 1.200 tons of steel structure and piping dedicated to a reheating furnace for MKK, which is located in Oural. This could represent a potential opportunity to develop Fives Solios Vostok throughout the Russian Federation.



Nicolas Pauzin, Managing Director of Fives Solios Vostok in Russia

How is this subsidiary complementary to Fives Moscow, our commercial office established 3 years ago?

Within Fives Moscow, Richard Serret and his team are in charge of all commercial activities in Russia for the whole Fives Group while Fives Solios Vostok gets involved after the contract signature, during the execution of the project.

Both companies are located in the same building and cooperate to evaluate and approve the local suppliers which will be selected on our future projects.

What is the impact of establishing this office in the industrial Russian market from a global point of view?

Through this organisation in Russia, Fives Solios and the Fives group demonstrates their willingness to be closer to their Russian customers while offering some local services with Russian language speakers.

In the near future, several revamping projects could be considered and they will require a local technical assistance with local equipment supply, to improve flexibility and the commercial offer. ■