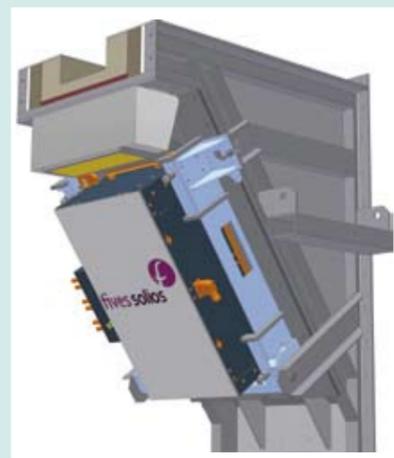


## GENIOS for the Aluminium Casthouse

The modern casthouse needs to maximize its product quality while maintaining operational flexibility. To meet this need, Fives Solios has developed Genios, a versatile new electromagnetic technology, which allows for furnace bath homogenisation.

Genios is a user friendly system capable of

- stirring the bath,
- submerging lightweight scrap or dispersing alloying elements within the bath,
- and transferring molten metal to downstream casters or crucibles - all from a single unit.



This device can be fitted simply and safely to a wide range of furnace types using its patented interface and mounting concept. The in-house electromagnetic inductor is operated by means of a solid state power and electronic control system for optimum process management.

With the Genios solution, aluminium producers will achieve energy savings, as well as better and faster alloy homogeneity while reducing cycle times, maintenance and environmental impacts.

This innovative solution further completes Fives Solios' technological offer which fulfils aluminium producers' requirements.

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## Fives Solios Services in the Middle East

Since 2002, Fives Solios has opened four subsidiaries in South Africa, Bahrain, China and Russia. Our main objective is to develop a long term partnership with our customers while providing after sales services and local assistance.

Hussain Al-Madeh, the Managing Director of Solios Services Al-A'ali answers five questions to explain his role.

**When was Solios Services Al-A'ali established?  
How many people work for this subsidiary?**

Solios Services Al-A'ali was established in Bahrain in 2003 when Fives Solios was working on the line-5 project at Alba. At the beginning of 2010, we have 6 employees who work in two departments, Technical & Administration.

**Why did Fives Solios decide to open this subsidiary?**

As part of the Alba Line-5 project, which was a major contract, Fives Solios decided to create a subsidiary in the Gulf region. The main purpose of this services subsidiary is to provide after-sales services to all customers in the Middle East, while strengthening Fives Solios' presence in this area. In order to develop a long term business activity, this subsidiary has been set up through a Joint Venture with a first class local company: Ahmed Mansoor Al-A'ali.

Solios Services Al-A'ali proposes the supply of spare parts, audits, upgrading projects, maintenance activities, and also supports Fives Solios' commercial activities in the Middle East.

**"Thanks to Solios Services Al-A'ali, Fives Solios demonstrates its willingness to be close to its customers by offering continuous services with Arabic language speakers"**

**Which areas or countries do you cover?**

We cover the Gulf and Middle East countries. The main customers in the region are Aluminium Bahrain (ALBA), Sohar Aluminium, Dubai Aluminium (DUBAL), Gulf Aluminium Rolling Mill Company (GARMCO), Egypt Aluminium (EGYPTALUM) and Almahdi Aluminium in Iran.

Two new customers have just entered the market in 2009: Qatar Aluminium (QATALUM) and Emirates Aluminium (EMAL) in Abu Dhabi.

**How do you collaborate with other Fives Solios companies?**

Regarding the spare parts activity and the audits, we work in collaboration with the

After-Sales department in each Fives Solios entity, depending on the equipment concerned.

When engineering or upgrading projects are requested by the customer, we work in close collaboration with a Proposal Engineer or a Sales Manager within a Fives Solios entity. In addition, we collaborate and support Fives Solios companies during major local projects execution (e.g. Qatalum) by providing site assistance. Our employees and Fives Solios' Technical and Commercial Departments work hand in hand.

**What is the impact of your presence on the local market?**

Thanks to Solios Services Al-A'ali, Fives Solios demonstrates its willingness to be close to its customers by offering continuous services with Arabic language speakers.

With a high level of reactivity, a quick supply of spares and better flexibility, Fives Solios' local After-Sales service assures continuous support for the plants and equipment operation.

In recent years, the Middle East, specifically the Gulf area, has become very attractive for companies involved in the aluminium industry. The presence of Solios Services Al-A'ali provides opportunities for long term relationships with Fives Solios' customers. ■



Hussain Al-Madeh, Managing Director of Solios Services Al-A'ali

# FIVES SOLIOS GOOD NEWS FOR YOU

F E B R U A R Y / 2 0 1 0



fives solios

### EDITO

*Towards the end of 2008, the primary aluminium industry took a brutal hit due to the collapse of the demand by the most important sectors: construction and transportation. The long-established producers reacted quickly by postponing all new investments and cancelling or delaying the projects already launched. Fives Solios, who is also addressing the markets of the emerging countries, responded to this challenge in 2009 by winning contracts with Hindalco and Vedanta who kept their investment pace in India.*

*To answer this demanding market, Fives Solios has established local sourcing services through its Fives' subsidiary, after having demonstrated over the years a capacity to manage projects in collaboration with local organisations.*

*In 2009, Fives Solios has carried on with the construction in Qatar of the Green Anode Plant, Fume and Gas Treatment Centers as well as the Casthouse Furnaces for Qatalum.*

*In UAE, Fives Solios has installed Celsius, the Hot Bath Processing Unit, for Emal. These facilities include all Fives Solios latest technological developments for high capacity smelters.*

*Meanwhile, by pursuing its efforts in R&D, Fives Solios, supported by Fives Group Innovation and Corporate Social Responsibility teams, is capable to supply its customers with high performance solutions which are innovative, cost effective and sustainable. Our driving force is our strong ability to optimize the balance between investment cost, energy efficiency, low emission technologies and operational flexibility.*

*Fives Solios is confident about the recovery and further development of the Aluminium Industry and remain your partner for designing today the plants of the future.*

Jean-Claude Salas, CEO  
Fives Solios

## 2009: a successful year in India for Fives Solios

Fives Solios' strong commercial activity in this region combined with the ability to provide innovative and competitive solutions, as well as its expertise in managing turnkey projects worldwide made 2009 a successful year in India.

Relying on Fives India, the Engineering Subsidiary located in Chennai that Fives opened in 2008, in order to establish the Group in India for the long term, Fives Solios has succeeded in coming back into this market through two major contracts.

In July 2009, VEDANTA awarded Fives Solios with an order for four Gas Treatment Centers on a turnkey basis, for their Balco expansion project located in Korba (Chhattisgarh State). These GTCs will treat gas coming from 2x336 electrolysis pots (one new and one revamped line), based on GAMI technology operating at 340 kA.

Each Gas Treatment Center will be fitted with eighteen TGT-RI filters and four exhaust fans. This contract will be implemented through a consortium with Fives India and Hindustan Dorr Oliver (HDO) for engineering studies, fabrication, construction, erection and civil works.

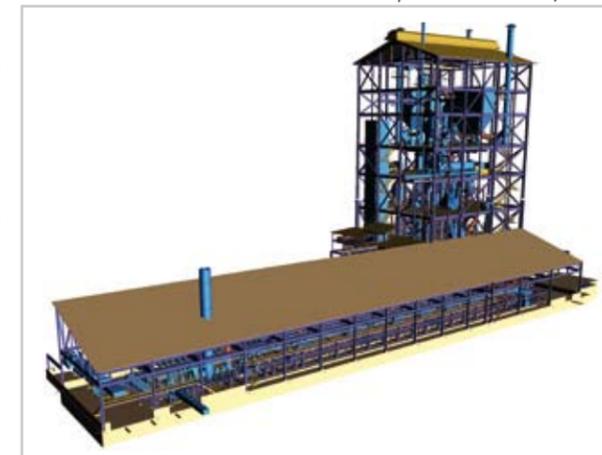
A couple of weeks later, in August, HINDALCO awarded Fives Solios with a global order for two Green Anode Plants at its two new smelters to be built in Mahan (Madhya Pradesh state) and Aditya (Orissa State). The capacity of both smelters will be 360,000 tpy of aluminium based on AP 36 technology.

Working with EIL, the Engineering Company assisting Hindalco in the execution of the projects, Fives Solios will supply a 35 tph Green Anode Plant for Mahan and a 52 tph High Capacity Green Anode Plant for Aditya, on a turnkey basis.

The contract will be implemented by a consortium led by Fives Solios with Fives India and McNally Bharat Engineering (MBE). Fives India, will be in charge of the local procurement of certain proprietary key equipment and of the integration of the related engineering data into Fives Solios' 3D models.

These contracts demonstrate Fives Solios' capability to adapt to the requirements of the aluminium producers, wherever they are located. ■

52 tph Green Anode Plant for Aditya



# Qatalum: a major project in the Middle East

In 2009, Fives Solios has commissioned some of its facilities at the Qatalum Smelter. In executing this project, Fives Solios has been actively participating in the construction of one of the largest and most efficient aluminium smelters in the world.

The first shipment of pitch was unloaded at the Fives Solios' Liquid Pitch Marine Terminal in November 2009.

The Qatalum Production team loaded the first cold metal into Fives Solios' Melting Furnaces at the beginning of December. The Green Anode Plant was handed over to Qatalum

Operations at the end of November 2009, ready to produce the first anode.

In order to meet Qatalum's objective, to produce first metal before the end of 2009, the first Fume Treatment Plant (GTC) was started on the 15<sup>th</sup> of December to treat the gas coming from the electrolysis pots. ■



Gas Treatment Center with Sea Water Scrubbers



Casthouse Furnace



Fume Treatment Center



Fives Solios team in front of the High Capacity Green Anode Plant



Liquid Pitch Marine Terminal

## CONTRACTS

### FTC in Kazakhstan

In November 2009, Riedhammer GmbH, a German specialist in the construction of anode baking furnaces, awarded Fives Solios with a contract for the design and supply of a Fume Treatment Center for the Greenfield smelter project carried out by Kazakhstan Aluminium in Pavlodar, Kazakhstan. Fives Solios has been selected for its experience in achieving high levels of performan-

ce in extreme operational conditions. The filters will be fabricated in China through Fives Engineering in Shanghai while other manufactured items will be procured in Russia through Fives Solios Vostok in Moscow.

### Solios Services contracts

In 2009, Solios Services Al'A-ali, the Fives Solios

services subsidiary in Barhain, was awarded two contracts in the Middle East.

The first one consisted of the revamping of the autogenous mill for the Alba Bath Processing Facility (line 4), in Bahrain.

The second one concerned the upgrading of the Sohar Aluminium vibrocompacting unit, in the Sultanate of Oman, in order to produce larger anodes needed for the pot amperage increase.

# Fives Solios at Emal: hot bath processing (Celsios)



In September 2008, Emirates Aluminium (EMAL) awarded Fives Solios with a turnkey contract for the supply of the hot bath cooling and processing plant for its new smelter in Abu Dhabi (UAE). This smelter will be one of the largest worldwide, with an initial capacity of 750,000 tons per year of aluminium.

For the first time, the bath processing plant, with a capacity of 34 tph of standard bath, will implement CELSIOS, the Fives Solios clean bath processing solution, which combines two sub-processes with a proven track record:

- The first section for pre-crushing and cooling: the hot bath is received at an average temperature of 600°C. This technology is based on the use of a specifically designed crusher and a low speed metallic pan conveyor. These technologies have already been successfully implemented in several European plants to cool the bath from up to 900°C down to 80°C, and have been confirmed as robust, clean and efficient.

**The plant has been designed to meet EMAL's high environmental standards**

- The second section, for final bath cooling and crushing, involves the fully air swept autogenous mill which has been already successfully implemented by Fives Solios in 17 plants in the last 25 years, with the valuable advantages of reliability, cleanliness, and reduced maintenance (almost no mechanical handling of the crushed bath is required). Over sweeping the mill with process air allows the production of coarse bath up to 0-20 mm.

The main advantage in combining these two sub-processes is to benefit from the process air flow through the mill to ensure the final cooling step from around 230°C down to less than 100°C, thus reducing the pan conveyor length by about 40%. As such, the required conveyor length for cooling purpose does not exceed the length required to lift the pre-crushed bath to the top of the 1,000 t buffer silo.

The plant also includes a skip hoist for feeding tapped bath ingots into the autogenous mill, a 1,000 t storage silo for standard bath plus a 200 t storage silo for pure bath, a big bag loading station for pure bath and two options for delivering the crushed bath either by pneumatic transportation or by bins.

The plant has been designed to meet EMAL's high environmental standards. The dust content at stack will match the benchmarking request of less than 5 mg/Nm<sup>3</sup>, and the flow

of fluorinated fumes collected on the cooling pan conveyor will be directed to the high efficiency pot

lines gas treatment centers (GTC). Both will contribute to drastically reduce the smelter total Fluorine emission levels.

The first cold bath was crushed on November 30<sup>th</sup>, 2009, and it was the first plant to be commissioned in the Carbon area. The performance tests with hot bath at full production capacity are scheduled for the end of March 2010. ■

## Upgrading filters for a better performance

Fives Solios completed the revamping of the Gas Treatment Center at the Aluminij Mostar plant in Bosnia Herzegovina. To meet the goal of an amperage increase of the smelter, the contract consisted of the addition of two Vibrair filters, one on each existing GTC. Moreover, Fives Solios has revamped all existing modules to upgrade their operation. Commissioning will start later in 2010.

## Firing Systems start up

Fives Solios has successfully started up several Firing Equipment and Control Systems:

- In India for the Anode Baking Furnace no.3 at the Vedanta Jharsuguda plant,
- In China for the Anode Baking Furnaces at Chuangyang, Qinghai and Yunnan, this last one being supplemented by the Helios Combustion Monitoring system.

## Meeting strict European environmental standards

Fives Solios has recently received the final acceptance for the casthouse furnaces supplied by Solios Thermal to a major secondary aluminium producer in Switzerland.

The scope included the supply of the basic casthouse engineering, the project management, five pre-heating furnaces and six melting / holding furnaces. The equipment complies with the strict emissions specifications required by Swiss environmental regulations.

## Xelios implementation

The first Xelios vibrocompacting machine has been in operation in a smelter since the end of 2008 and is producing green anodes with density up to 1.70. Good results have also been achieved in terms of green anode consistency and anode flatness. The Xelios vibrocompactor which is presently under commissioning at Qatalum will confirm these results.

Xelios will be soon installed at Hindalco, Mahan and Aditya smelters.

Fives Solios has received the Provisional Acceptance at Qingtongxia Maie in China for a twin table vibro-compacting machine fitted with a vacuum system and top back pressure. The first anode was produced in August 2009.