Safas SpA:

"Experience is every

Safas SpA was founded in Italy in 1959 by Giovanni Pasqualotto, who from the very beginning focused on producing castings for very high quality markets. Over a half century later the company remains dedicated to producing only the highest possible quality castings for a range of applications including the nuclear industry, and has the proven track record to back up its claims of excellence and quality control. Today Safas remains a family-owned company; Nuclear Exchange spoke to the CEO and son of the founder, Mr. Matteo Pasqualotto, about this most demanding of industries and how over the past 60 years the company has come to be one of the leading casting producers in the world for the nuclear industry.

By Joanne McIntyre

The company's strategy on focusing in high quality markets had a profound influence on the choices it has made with regard to investments and the markets in which it participates. During the 1970s the Safas entered the civil nuclear market, supplying items for the Italian, French and German reactors according to ASME, DIN or CPN specifications. The items produced were valve and pump casings, impellers and diffusers for primary and secondary circuits.

"We consider our very long history and years of experience in the nuclear market to be one of our most strategic strengths," explains Mr. Pasqualotto, company CEO. "We have fully technicians who completely understand the standards used for nuclear items and who have worked for Safas since the 1970s. This exceptional degree of experience among our staff, combined with our very extensive technical and metallurgical knowledge, allows Safas to collaborate with its customers at a very high level to co-design parts and achieve the best possible technical results while keeping costs under control."

"Our long history and years of experience are a strategic strength."

"We also consider our long years of experience to be very important because it's an additional guarantee of

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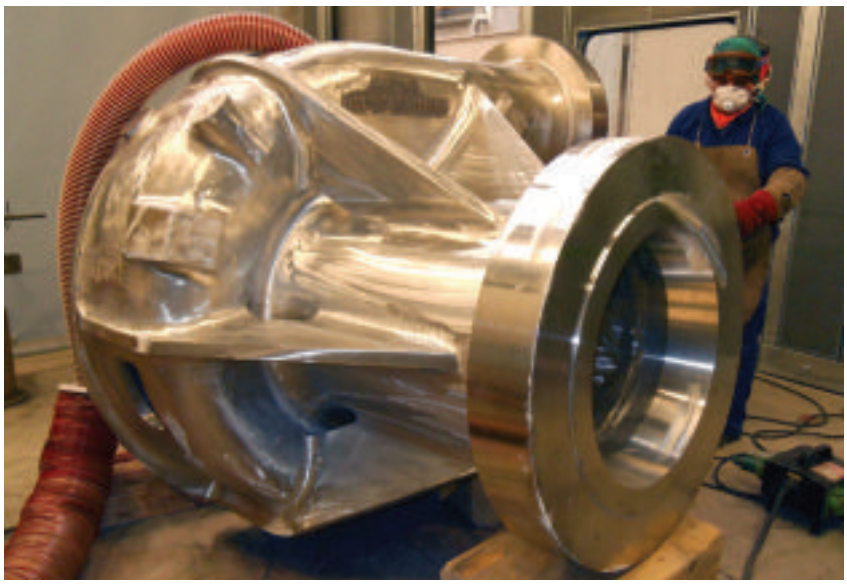
the efficiency and quality of our process control," continues Mr. Pasqualotto. "The foundry business is very complicated; in order to succeed and not create problems for the customer you must have experience. In recent years some foundries without the necessary experience and know-how have promoted themselves as suppliers of key components to nuclear power plants. The resulting unsatisfactory results influenced some of the decisions made during the design of such components, which in turn oriented the manufacturing of these to alternative solutions, such as forging. Keeping in mind that the large majority of the reactor coolant pumps in operation are based on casting technology, we saw this as a disturbing development."

A wealth of prestigious projects

Over the decades the company has built up a long reference list of projects around the globe. Since the 1970s it has supplied casting for Gen 1 and Gen 2 reactors all over the world, and in particular for Italy, Brazil, France, Germany and Korea. "For these projects we supplied castings for both the primary and secondary



Main reactor cooling pump of Cadarache (reactor Jules Horowitz).

circuits," continues Mr. Pasqualotto. "These projects include all of the Italian reactors (which have since been decommissioned), as well as Angra Units 1 & 2, Civaux Units 1 & 2, Krsko, Isar Units 1 & 2 , Oskarshamn Units1-3, Kedo, Shin Kori….we also supplied casings for the primary cooling circuit of the Trafalgar class submarine which were fitted with Rolls Royce nuclear engine propulsion."
In more recent years, with regards to Gen 1, 2 and 3 reactor technologies, Safas has supplied, according to ASME and RCC-M standards, around 50 primary cooling pump casings and internal items such as impellers, diffusers and motor stands. Projects for which these were supplied include Olkiluoto Unit 3, Flamanville Unit 3, the CPR China plants (Ling ao etc) and Taishan Units 3 & 4.
Safas has also supplied the primary cooling pump casing for the Jules Horowitz Reactor, a material testing reactor located in Cadarache, France for the development and the qualification of materials and fuel used in the nuclear industry.
"Today we are working on projects mainly related to the Far East markets," continues Mr. Pasqualotto. "We are currently producing items for primary

The highly experienced staff at Safas is one of the keys to its success.

cooling circuits for the CAP 1400 reactor prototype Changjang Units 1 & 2 in China, and Braka Units 1-4 in the United Arab Emirates. Meanwhile in Europe we are collaborating with Areva for the life extension program of the French fleet, and producing spare parts for the Liebstadt plant in Switzerland."

Wide range of products

"Safas supplies special bearing casings, valve casings, pump casings and impellers for secondary circuits and pump casings, impellers, diffusers, motor stands and other items, generally called "internals", for primary cooling circuits. The company's very long experience also enables Safas to collaborate with their customers to find the best technical solutions, including the replacements of obsolete parts; this is a very important factor today as there are many life extension programs taking place around the world," explains Mr. Pasqualotto. The company is able to deliver casings up to 35 tons, completely machine finished and pressure tested.

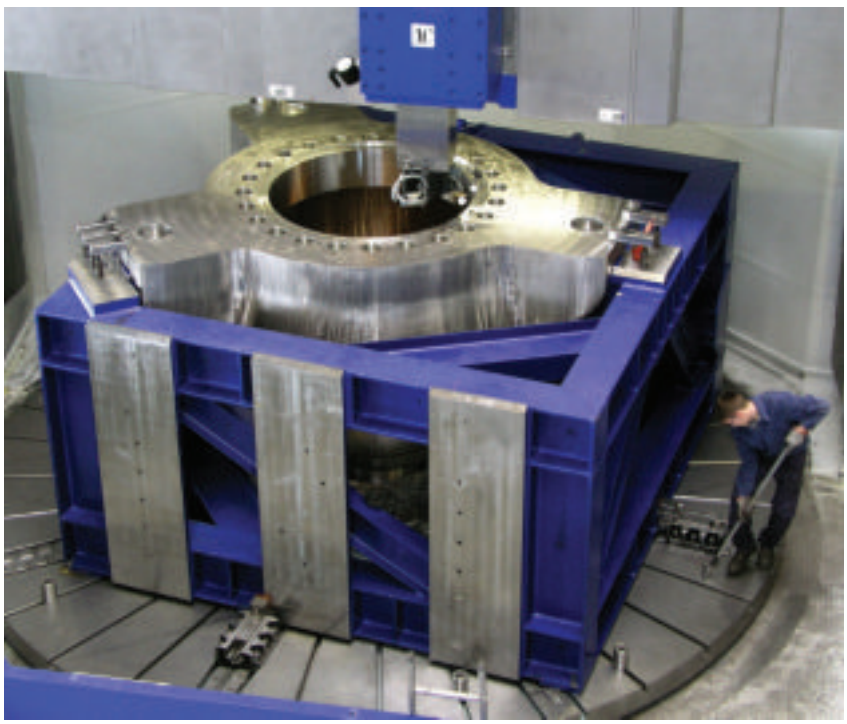
While Safas castings have been supplied to nuclear power plants all over the world, its main markets are France, Germany, Korea, India and China. "Today we are working on extending our Russian and North American market share," continues Mr. Pasqualotto. "Many changes have taken place in recent years in every step of the production cycle; too many to list here! However those changes have mainly be focused on improving the final quality of the product. Ten years ago it was impossible to think of casting a piece weighing 30 tons, 100% x-ray checked, with no major defects to repair. Today Safas is able to achieve such a result, with the obvious benefits in terms of delivery time and costs.

Penetrant test on a diffuser of primiry circuit.

State-of-the-art equipment, specialized nuclear department

The company continues to invest in technology to provide castings to keep up with developments and continue to provide castings of the highest quality. "We recently finished the third extension of our Nuclear Department, an investment

Men at work at the steel mill.



Main reactor cooling pump during final machining.

that takes advantage of over forty years experience in the market and has increased our output capacity of castings for nuclear applications," continues Mr. Pasqualotto.

"Today we have the capacity to deliver annually up to 20 reactor coolant pump casing castings of 30 tons, completely machine finished and pressure tested, with a very fast delivery time and at a competitive cost. This means we have now reached an important target: we are and will remain the main casting producer for nuclear applications, assuring our clients that they will have no problems in the future in terms of quality and capacity."

The state-of-the-art equipment at Safas includes electric arc and induction furnaces and AOD/VOD refining systems particularly suitable for the production of low carbon austenitic and martensitic stainless steels. The foundry department has all necessary simulation devices to facilitate the design of pouring/feeding and cooling processes at the best possible level. "Very importantly, all of the finishing processes are carried out in a separate department, dedicated exclusively to castings for nuclear applications. This Nuclear Department includes a 9 Mev linear accelerator for the radiographic testing of all the parts, and an emplacement for hydrostatic tests up to 400 Atm."

Main reactor cooling pumps during manufacturing at Safas.

Looking ahead

Despite the hurdles that nuclear power generation is facing around the globe, Mr. Pasqualotto remains optimistic about the future of the industry.

"There have been some significant obstacles which have halted the so called "renaissance" of the civil nuclear industry," he explains. "The main inhibiting factors include the Fukushima incident, the delay and cost of the new Gen 3 reactors, and the dynamics of natural gas prices in the United States. However we are confident that the renaissance will restart within the next one to two years."

"The world is waiting for the first Gen 3+ reactors and the opportunities they bring to the global market, in particular;

- The decrease of cost per kilowatt the EPR reactors currently being built in Taishan will offer;
- The reduced cost of the AP1000 reactors being built in Sanmen;
- And the Chinese CAP 1400 which together with the Kepco APR 1400 will play an important role in the world market.

We also believe that the development of small modular reactors will bring significant benefits to the market," Mr. Pasqualotto concludes.

Grinding of a main reactor cooling pump before dispatching.

Facts & Figures

Name:	Safas SpA
Founded:	1959
Turnover 2011:	EUR 50,000,000
Employees:	180
Key Markets:	Nuclear power, fossil & other power generation, oil & gas, offshore
Products:	Valve casings, pump casings, impellers, diffusers, castings for hydro turbines: Pelton/Francis/ Kaplan and guide vanes, steam and gas turbine casings and accessories, castings for offshore