Getting ready for the nu renaissance

There's a lot of interest in the nuclear power industry these days. Commentators in both the USA and the UK, for example, have told Focus on Nuclear Power Generation that they expect "big things" in the upcoming ten to fifteen years. The potential implications for the valve supply industry are understood to be significant. We therefore did not pass up the chance to talk to a man with exceptional insight into both valves and the nuclear industry - Mr Bill Fitzgerald, Nuclear Business Unit Director Fisher® valves for Emerson Process Management. We asked for his thoughts on the future of the nuclear sector and the current response from the valve industry.

by David Sear and Christian Borrmann

The focus for valve suppliers to the nuclear industry in the USA could be set to change. For the past twenty five years they have primarily been servicing an MRO-based market, with spare parts and the occasional valve assembly being sent to one of the approximately 120 nuclear power plants. True enough, some plants have recently also been investing in technology upgrades and putting in larger valves to help increase power output. But overall, turnover could best be described as modest. Of interest, yes, but modest. Bigger things could be just around the corner though. To meet future energy needs, there are serious plans afoot for many additional nuclear power plants in the USA. Says Mr Fitzgerald: "Right now we are tracking about 40 projects currently under consideration in North America. They vary from large-scale power plants down to putting two new CANDU reactors into the oil sands. These would generate both electricity and also the heat which is required in the oil extraction process."

The big question, of course, is how many of these projects will come to fruition. Mr Fitzgerald: "In my educated opinion, I'd estimate that about two-thirds will actually be built. Start-up could be as soon as 2015 for as many as 8

units. We are basing our estimates on economic, social, and political factors. If you consider issues like global warming and a desire for energy independence then there are good arguments for nuclear power. It can never be the only solution, but it is a logical part of the solution."

Critical

A time-frame of just seven years to completely design, build and commission a new nuclear power plant may sound ambitious, but is actually quite realistic, according to Mr Fitzgerald. "The big engineering firms and also the NRC [Nuclear Regulatory Commission] have recently gone out and have significantly added to their staffs. They are gearing up big time. We understand that the NRC's goal is to be able to turn an application for a new power plant around within three years. There have already been a number of combined operating licence applications. Now that does not mean an order will actually follow, but it is a clear sign of intent."

It appears that the parties involved may also work on parallel tracks to facilitate shorter lead-times. Mr Fitzgerald: "For example, whilst the NRC is reviewing the plans, the engineering company may already start work procuring the long lead items. For example, reactor vessels, etc, which can take three years from order to delivery. Shortly after they can also consider other critical items, like control valves, pumps, etc. Based on this, we see significant valve order activity probably occurring in 2009 or 2010, all pointing towards start-up for some new units in 2015."

Asked if he could amplify on the statement that control valves are critical equipment, Mr Fitzgerald comments: "Firstly, control valves have long lead times because the ASME has just issued new qualification requirements. So to use a valve in a given safety related application will probably require 18 months of qualification testing. We also have to factor in ever-tighter seismic requirements. Then materials procurement, machining, assembly and testing will probably take an additional 9-18 months, depending on valve type. So, we believe that if we get an order today for a nuclear grade valve it could take as long as three years to actually deliver it to the end user."

He further notes that the time required for qualification testing reflects the job the valve does in the power plant.

Mr Bill Fitzgerald, Nuclear Business Unit Director Fisher® valves for Emerson Process Management.

"Control valves are used in safety-critical areas. So you have to be 100% certain the valve will work when it needs to. Therefore, even though control valves may only be a very small part of the overall budget, if that one safety related valve does not get delivered on time or doesn't work, it will stop the plant from coming on-line."

Global activity

In order to be prepared for the expected "nuclear wave", Emerson for one has been beefing up its resources. This includes the recruitment of additional qualification and design engineers. Comments Mr Fitzgerald: "Right now we are creating a global team. After all, the technology is shared around the

Due to the long lead times, control valves are seen as critical equipment for nuclear power plants.

Commentators indicate there could be "big things" in the nuclear power sector in the upcoming ten to fifteen years.

globe, and companies like AREVA, GE, AECL, and Westinghouse are selling plants world-wide. There are even voices who want the North American solution to be based on plants sold in Europe. So it makes sense to both increase the size of the team as well as the scope of the interaction among our global offices."

That global team could well be kept very busy. Nuclear activity is of course not just restricted to the USA. Indeed, Mr Fitzgerald expects "significant nuclear activity" from additional world areas such as Latin America, Europe, the Middle East and Asia Pacific. He notes that even the oil rich countries are considering building reactors so they can save fossil fuels for export. "Egypt, Algeria, Nigeria, Qatar, and Turkey have all indicated their interest in building a couple of reactors apiece," he says.

Wherever the demand originates, Mr Fitzgerald is confident that Emerson has sufficient manufacturing capability to produce the required numbers of Fisher® valves. "Looking from the manufacturing standpoint a typical order for a nuclear power plant would be in the hundreds of valves. By contrast, an order for an LNG facility can be 10 times that size. We are already geared up to manufacturing valves on that scale. So the dollar value/item might be higher for nuclear, and the engineering and qualification might be more involved, but, given our size, in terms of the actual manufacturing process, we have plenty of capacity."

Digital technology?

The nuclear industry is often viewed as very conservative. Mr Fitzgerald for one appreciates this caution. "The number one directive of the NRC and indeed all the nuclear plants is to ensure public safety. They have been doing a great job for many years and they are rightfully careful. Having said that, we are seeing more interest in new technologies, such as digital control. Some existing plants have implemented digital architecture upgrades, for example. In part this may be due to material obsolescence. But whatever the reasons, I expect that once engineers see the results of using digital technology in existing plants, they are much more likely to implement it in the new-builds as well."

Mr Fitzgerald anticipates that fieldbus systems could even be used in certain areas. "From a process control viewpoint fieldbus systems offer the ultimate solution in terms of flexibility and utility. Fieldbus minimizes the amount of cabling needed in a plant, simplifies start-up and commissioning, is very high speed, and you can run 32 valve controllers off a single cable. I see fieldbus being primarily installed in the balance of plant applications, where qualification requirements are less stringent."

In this light, Mr Fitzgerald notes that Emerson has already completed the EPRI certification process for its new FIELDVUE® digital valve controller. Other valve suppliers are also actively gearing up to support the nuclear industry, he believes. Mr Fitzgerald: "Across the board, I believe that the valve industry is very pro active about helping the nuclear sector. We all see a lot of positive things coming from the renaissance of nuclear power. All the valve vendors, both control and on/off, appreciate that. We are all taking measures to ensure our capacity will meet future demand and to ensure plant designers can most easily leverage the new technology."

According to Mr Fitzgerald, issues like global warming and a desire for energy independence mean there are good arguments for nuclear power.