

# Nuclear control valve experts meet at Innovation Center

The USA-STARS nuclear air-operated-valve (AOV) group held its 2010 summer training session in June at the recently opened Emerson Innovation Center in Marshalltown, Iowa. Serving as co-hosts for the two-day event were Emerson's vice president for Fisher nuclear valve products, Bill Fitzgerald, along with Tim Scoggins, valve team program manager for USA-STARS.

In his opening remarks, Fitzgerald encouraged the attendees to have open, honest discussions of control valve issues, concerns, wants and needs. He emphasized that the new, USD 30 million Emerson Innovation Center with its focus on Fisher technology would give them an unmatched opportunity to learn about and then watch the latest control valve developments in action. Fitzgerald characterized the two-day event as a great opportunity for attendees and engineers to interact.

Tim Scoggins also stressed that USA-STARS members would benefit by sharing information with the engineers who design and test valves and field instruments. "This way we can continue to solve old problems and address new ones in a cost-effective manner," he stated.

Following these opening remarks, Terry Buzbee, president of the Emerson Fisher valve division addressed the USA-STARS attendees, identifying the Innovation Center as home to the world's largest "flow lab." Buzbee related how the scaling up of industry capacities in recent years pointed to a parallel need for large-scale control valve development. He stated that now for the first time, due to the lab's up to 36" diameter line sizes and its high flow rate and pressure capabilities, large valves can be tested against real-world plant conditions. Buzbee identified this ability to verify valve performance as being critical in helping ensure a product's reliability, efficiency, environmental com-



Terry Buzbee, president of Emerson Process Management, Fisher, welcomes USA-STARS members to their 2010 summer AOV conference, which was held at the new Emerson Innovation Center in June of this year.

pliance and safety before it's installed at a customer site.

The two-day event featured several group sessions, the first providing a look at the Fisher nuclear valve business unit headed by Bill Fitzgerald. Formed four years ago, this team now focuses the efforts of over 100 individuals on improving response to nuclear customer needs within existing plants as well as meeting the emerging valve demands associated with next generation plant design.

In describing the nuclear business unit, Fitzgerald identified his organization's key goals as providing best-in-industry quotation response, improved on-time delivery, and continued new product development specific to the nuclear industry.

Just how the on-time delivery initiative was being met became apparent during a mid-day tour of the Marshalltown located valve manufacturing plant. Most of the

## About USA-STARS

Utilities Service Alliance (USA) Inc is a consortium "fleet" of numerous nuclear power sites owned by different utilities, that have joined together to reduce operating and maintenance costs, and to share best practices, with a goal of improving site performance and to influence nuclear industry activities, where appropriate. The Strategic Teaming and Resource Sharing (STARS) group is another consortium of nuclear power plant operators that was formed with very similar goals in mind. When it comes to addressing issues concerning air-operated valves (AOV's), the two groups have come together and work very closely to keep up with new technology and new approaches to solving problems with their valve population. Tim Scoggins acts as the primary coordinator between the two groups on AOV issues and they've been meeting for more than 10 years now and have made significant progress on improving overall valve performance as a result.





*Interest was high in product demonstrations provided by Emerson engineers during a mini-tradeshow that followed the USA-STARS general sessions.*

manufacturing processes within this large facility are organized as value streams. That is, valves are built start to finish following a line-of-sight production path. This method of manufacturing reduces the handling of valve components, resulting in a shorter time to ship finished product.

### **Valve sizing methodology**

Trent Johnson, manager of the Fisher project qualification engineering group, provided a quick review of Electric Power Research Institute valve sizing methodology and how it aligns with Fisher valve sizing principles. He noted that the EPRI sizing equations are similar to those historically used by Fisher engi-

neers, and that the EPRI methodology was used to size valves at the quotation stage for the Westinghouse AP1000 project.

However, Johnson cautioned that several factors come into play when sizing control valves. He emphasized that tolerances used in the valve sizing process should be realistic, that it's important to recognize that not all valve brands are equal, and that the sizing procedure should not be excessively conservative. He explained that oversized equipment can result in significant problems, such as bigger actuators leading to more valve body material, which in turn increases piping loads requiring more structural support.

### **Product reliability**

What is reliability and how does it impact the customer and the supplier were questions answered by Ken Carder's discussion of reliability engineering. According to Carder, manufacturers deal with the inherent reliability of the product, which is dependent on design and quality control. Customers deal with operational reliability of a product as it is applied and observed over time. Together, stated Carder, these measures of reliability describe the achieved reliability of a product, and improving that measure of reliability is a constant goal of Fisher valve engineers. According to Carder, improving product reliability brings benefit both to the valve user and to Emerson. For the valve user, such as the USA-STARS members, reliable equipment means that it is available, in operation and functional when needed. For Emerson, he explained, improved reliability minimizes the cost of administering a product design and has a positive impact on the Fisher brand.

Product reliability was also a key point of Steve Hagen's update on the Fisher FIELDVUE® line of digital instruments. Hagen reviewed the move to linkage-less, non-contact feedback technology in all FIELDVUE products, including the latest release in January of the DVC6200 digital valve controller.

He explained that the feedback system for the DVC6200 controller utilizes a magnetic assembly for position measurement, with the magnet assembly material being specifically chosen to provide a long-term stable magnetic field. The high performance, linkage-less feedback system eliminates physical contact between the valve stem and the DVC6200. And Hagen reasoned, since there are no wearing parts, cycle life is maximized and overall product reliability benefits.

Another feature of the FIELDVUE instrument that prompted discussion was its remote mount capability. Hagen reviewed the advantages given by separating the position sensing segment of the controller from its electronics, especially in high temperature and/or high vibration situations. He explained how the mounting brackets for the controller had passed extensive vibration analysis and evaluation as yet another measure of product reliability.

### **Noise abatement**

Control valve noise abatement is a continual topic among valve users due not only



to the need to provide safe and sustainable operating noise levels in the plant, but also to meet legislated limits. Severe service valve specialist Mark Petrucci gave an extensive review of both aerodynamic and hydrodynamic noise phenomena. A later demonstration of cavitation was provided within the main flow lab allowing the attendees both to see (thanks to the use of clear, plastic piping) and hear the process of vapor bubbles forming and subsequently imploding. Yet another demonstration within the lab of aerodynamic noise utilized laser generated shadow graphs to visually illustrate how flow jet interaction creates audible noise levels.

The USA-STARS attendees investigated and discussed new valve innovations through a series of technical presentations given by Fisher valve research and design engineers. The 45-minute sessions covered such topics as valve materials, loop tuning, valve maintenance and performance differentiation. As mentioned, highlighting the presentations were tours of the flow lab of the Emerson Innovation Center, with featured demonstrations of not only cavitation control and jet stream interaction, but also vibration analysis techniques as well as advances in antisurge valve control. On their tour of the Innovation Center flow lab, meeting attendees were able to view the elaborate test setup used to verify operating characteristics of the Fisher SS264 control valve. This valve design was chosen recently by Westinghouse Electric Company for use in its newest generation of nuclear power plant, the AP1000™. Critical to the SS264 proof-of-performance testing was the exact duplication of the AP1000 piping configuration in which the valve will be used for residual heat removal. Joel Dill, AOV program manager for the Kewaunee nuclear station near Green



Steve Hagen introduces the remote-mount capability of the FIELDVUE® DVC6200 digital valve controller to USA-STARS members.



USA-STARS meeting attendees witnessed a number of live demonstrations of flow phenomenon, such as cavitation and noise jet interaction, within the new, \$30-million Emerson Innovation Center.

Bay, Wisconsin, summarized the opinion expressed by many USA-STARS attendees that it was good to see Emerson's commitment to the nuclear industry as shown by the Emerson Innovation Center.

In closing the two-day event, Bill Fitzgerald again encouraged the USA-STARS members to continue with an open exchange of ideas between their plant sites and Fisher valve engineers.

A tradition has begun at the USA-STARS summer conferences that are held at Emerson's Fisher valve headquarters in Marshalltown, Iowa, and that is an evening, outdoor barbeque at the countryside residence of Bill and Vicki Fitzgerald.

Ever the gracious hosts, the Fitzgeralds open their home to conference attendees, who in turn enjoy Iowa style food, wine and entertainment. This opportunity to relax and share experiences is a welcomed addition to the two-day, technology focused conference.

A large tent on the front lawn of the Fitzgerald residence served as the dining center for the USASTARS barbeque evening.

