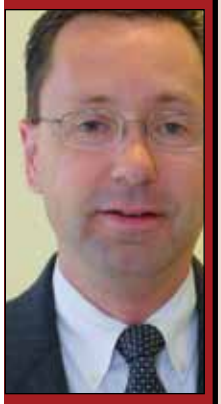
Technology Platform Extensions Update

Editor's Note: *Chris Rossi was named vice president of Technology and Business Development for Dresser-Rand in January 2009. He holds a BSME from Virginia Tech and an MBA in Corporate Finance and Operations Management from the University of Rochester's Simon School of Business. The following article provides an update on the strategic product technology platform extensions introduced last autumn.*



Chris Rossi vice president of technology and business development

At Dresser-Rand, we believe that technology is a key enabler to the value proposition we bring to clients. Therefore, we continuously invest in extending the capabilities of our existing product technology platforms. Three such technology extension programs that we are currently working on include the DATUM® ICS, steam turbine flow path efficiency and supersonic compression. The following provides a description of the technology advancements expected from each program and the improved value proposition afforded to clients.

The DATUM® ICS Compressor: A Unique Dresser-Rand Solution

The DATUM® I integrated compression system (ICS) builds on the technical and commercial success of the DATUM line of centrifugal compressors. To date, we have sold more than 900 DATUM units for virtually every type of critical gas compression application.

The key feature of this technology is the integration of the liquid separator, compressor and process piping and coolers into a single lift package. This unique solution allows our clients to eliminate the space and costs associated with stand-alone liquid separation systems and to reduce the size of the package when compared to standard process packages.

The Dresser-Rand design incorporates a rotary separator before the first stage impeller. This high-speed rotating separator technology is patented and *only* available from Dresser-Rand. While competitors offer compact compression, their solutions do not remove liquid from the gas stream inside the casing prior to the gas entering the compression stages. Therefore, clients electing to use a compression solution other than the Dresser-Rand ICS will need a large amount of space to incorporate a traditional separation system. However, if the solution is to bypass the separation process altogether, the client will end up with a compressor that has to handle wet gas. This requires significantly more power and compromises long-term system reliability. Since the DATUM ICS incorporates the separator in the compressor, the compressor stages essentially operate in a dry gas environment.

The DATUM® ICS (see photo below) reduces the total footprint required by conventional modules by as much as 50 percent while also cutting the total weight by a similar percentage. Each package is factory-tested in the multi-phase test facility in

DATUM® ICS.

Olean, N.Y. The single-lift package is delivered from the factory, ready to be connected to the process piping and power source. This plug-and-play approach significantly reduces installation and commissioning time, allowing production to begin sooner than otherwise possible with traditional compression modules.

DATUM® ICS loaded on truck for shipment to South America.

The above advantages have been confirmed by our first production DATUM ICS unit that will soon be commissioned in the field. Petrobras needed more compression for an offshore production platform, but did not have the space for a conventional compressor. The DATUM ICS provided the perfect solution.

Because these same features that provide value for topside applications are also important in a subsea environment, our engineers are working to develop a marinized version of the DATUM ICS. In June of this year, Dresser-Rand launched a joint industry development program based on the ICS with one of the premier producers in the industry, a long-time client and a recognized technology leader. We believe this joint development program will lead to an improved value proposition for the "only-in-class" ICS, and will help accelerate the broad market acceptance of the technology for both topside and subsea applications.

Part of the plan includes conducting a full-load, full-pressure test of an 8 to 12 MW unit handling a wet gas stream, while the compression train is submerged in our subsea test facility in Olean, N.Y.

Steam Turbine Efficiency: Key Enabler to Decrease Emissions and Carbon Intensity

Our steam turbine flow path efficiency program is focused on improving steam turbine efficiency, while maintaining the reliability and robustness that clearly identifies a Dresser-Rand product. In particular, we are applying multiple technologies, such as advanced sealing techniques, integral covered buckets, higher temperature materials, advanced impulse aerodynamic designs, increased stage loading, and highly efficient inlets, to name a few.

Applying our targeted efficiency improvements, for example, to a 50-megawatt steam turbine, could save a client approximately $4 million in fuel costs over the life of the equipment.

We also plan additional investment in our field and lab validation capabilities in order to improve our ability to characterize stage and section aerodynamic performance, and validate aeromechanics behavior of flow path components. Validation is a key element to be able to manage performance risk and to calibrate our design tools and processes.

We expect to complete the design and demonstration phases for this advanced steam turbine technology in the next three years.

Supersonic Compression Technology

CO_2 compression is not new to Dresser-Rand; however, environmentally-conscious applications are of increasing importance to our clients. One particular application, carbon capture and sequestration, or CCS, involves removing CO_2 from the waste gas stream of a coal-fired power plant, compressing it and transporting it for injection and storage in an underground cavern.

We are building the first supersonic CO_2 compression test facility in the world.

continued on next page >>

World's first supersonic CO_2 compression test facility - Olean, N.Y., USA.

CCS provides a method for reducing greenhouse gas emissions from traditional fuels burned at power plants. Coal-fired plants especially are experiencing increasing legislative pressure to reduce CO_2 emissions.

Over the past few years, Dresser-Rand has been investing in the research and development efforts of Ramgen Power Systems LLC, a Seattle-based technology company that applies proven supersonic aircraft technology to ground-based air and gas compressors. We are building the world's first supersonic CO_2 compression test facility at our Olean Operations that will enable the comprehensive testing of the RAMGEN® supersonic compressor technology. The commissioning stage is underway and testing is expected to ramp up very soon.

Understandably, the U.S. Department of Energy and various utilities are interested in reducing the cost of CCS and have expressed interest in supersonic compression technology. In fact, supersonic compression is so effective that a single-stage supersonic compressor is projected to achieve a 10:1 pressure ratio compared to a typical DATUM compressor stage of 1.3:1 to 2:1 pressure ratio. With a second stage of compression, a 100:1 pressure ratio is realized. So for a given application, the supersonic compressor is much smaller than a traditional centrifugal compressor. As such, it will be a less expensive initial investment for clients and will result in significant savings in operating and total installed capital costs.

Supersonic compression is not limited to just carbon dioxide, which is a high molecular weight gas; it can also be used for a range of medium to high molecular weight gases including air. Consequently, it can be applied in a compressed air energy storage (CAES) power plant where off-peak or wind / solar generated electricity can be used to power a generator that drives compressors to force air into an underground storage reservoir at high pressures. During peak demand, the compressed air can be released and expanded to run through turbines to generate power. Since air compression is essential to the CAES process, supersonic compression has the potential to lower plant and equipment capital costs by up to one-third and offers substantial fuel savings. Twenty years ago, Dresser-Rand was instrumental in building the first CAES plant in North America, in McIntosh, AL, and proved its capability to custom-engineer a CAES train to provide a complete system to meet a client's operating and geological requirements.

Conclusion

Our investments in technology, as I've reviewed with these three platform extensions, are key to Dresser-Rand continuing to provide some of the most reliable and efficient rotating equipment technology and service solutions in the industry, while lowering our clients total cost of ownership. We expect these technologies will play a significant role in both our traditional oil & gas markets, and also in the expanding environmental solutions space. ●