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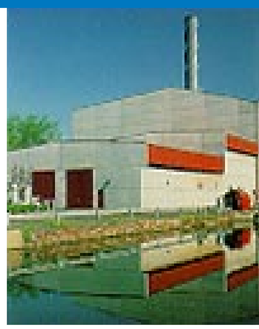
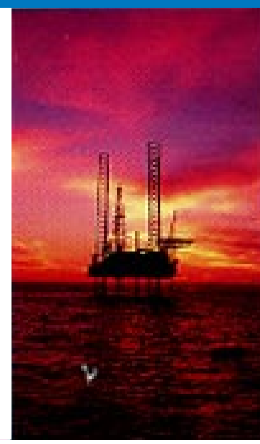
Solutions





Dexter Cogeneration Meets Strict Noise Abatement Requirements With DRAG Valve Technology

There was a time not too long ago that paper mills didn't worry much about safety valves blowing during normal operations and sending a high-pitched whistle across acres and acres of uninhabited forest. But times have changed. Concerns about worker safety and noise pollution have led local, state and federal governments to pass stringent noise compliance regulations.

Consequently, mill operators can no longer afford to ignore the noise generated by these safety valve blow-offs. Fines are stiff, and disgruntled neighbors can shut a mill down for non-compliance with a few well-placed phone calls to local regulators.

This was a major consideration for the Dexter Corporation when they began design work on their specialty paper mill and cogeneration plant in Windsor Locks, Connecticut, in 1989. "The initial design called for 21 separate safety valves in the steam flow system," notes plant manager, Thom Harnsberger. "We had to find a cost-effective way to control noise and avoid high maintenance costs."

The Dexter Cogeneration plant comprises an electrical power generation plant and one of the largest specialty paper mills in the United States. A G.E. Frame 6 gas turbine generates approximately 8 megawatts for mill use and

Dexter Cogeneration Plant

sells 38.5 megawatts continuously to Connecticut Light & Power. The paper mill produces a large percentage of the tea bag paper used in the U.S., along with meat casing and medical specialty items.

Of immediate concern to Mr. Harnsberger was the steam flow system that was designed to deliver heat to the mill's paper driers. "The gas turbine's exhaust is routed to our main heat recovery steam generator (HRSG)," he explains. "Steam used in the paper drying process then goes to the paper mill through two different systems - a 90 psi (6 bar) header system and a 300 psi (20 bar) header system.

"Both systems have to be protected during start-up, shut-down and during normal steam swings, which may be as much as 60% of total steam flow. This is where the 21 safety valves come into play. And this is why we looked to DRAG valve technology for a cost-effective solution."

As the original design took shape, the company looked at two different solutions. The first method was to wrap each safety valve in noise-control baffling. This solution was unsatisfactory for two reasons. First, it would be extremely expensive. Second, with 21 different valves capable of blowing during system upsets, the ongoing maintenance costs would be excessively high.

The alternative was to install a DRAG valve with an atmospheric resistor in each header system upstream from the safety valves. These valves would be set to activate at a slightly lower pressure than the safety valves, and vent steam to the atmosphere through the resistor.

After comparing initial capital costs and estimating ongoing maintenance costs, the engineers at Dexter chose to utilize DRAG valves supplied by Control Components Inc. (CCI). The company installed a 6", 600 ANSI valve with DRAG trim in the high-pressure line, while a 10", 300 ANSI valve with DRAG trim was placed in the low-pressure line.

Immediately downstream from each valve, an atmospheric resistor was installed which also utilized DRAG technology. Both of these silencers had disk stacks 36" (92 cm) high with an outside diameter of 23.5" (60 cm). The 52-turn disks were designed to meet the stringent noise-abatement standard of 51 dBA at the company's property line, which was 200 feet (65 m) away. Each resistor was covered by a metal shroud measuring 5' (1.5 m) in diameter by 19' (6 m) high.

"These days it's important to be a good neighbor," Harnsberger concludes. "An involuntary shutdown would probably cost us something like $50,000 per day. More important, however, is the community goodwill we'd lose if we were in violation of local noise-abatement standards. You only have just so much goodwill, and it's foolish to throw it away when a cost-effective solution is easily at hand."

CCI has many similar systems in operation. References are available upon request.

DRAG valve trim consists of a stack of disks, each of which has a series of right angle channels etched into its surface.

"The plant began operating on April 14, 1990, and since that time we haven't had a single safety valve blow. Even though the DRAG pressure relief valves open at least once a week, we've stayed well below allowable noise levels. The DRAG valves reseat automatically, and maintenance costs have remained low"

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Thom Harnsberger

Quick Turn-Around Of Custom-Engineered Valves Becomes A Reality At Control Components

The people in charge of running a large, fossil-fuel power station in the southeastern United States had an annoying problem. Because of severe cavitation encountered each time the plant started up, a 12" feedwater regulating valve was constantly being damaged. “Every time we’d bring the unit up, the pipes and valve would shake and rattle all over the place,” said a company spokesman. “This, of course, caused internal damage to the valve.”

CNC bandsaw cuts barstock with precision and speed, enabling CCI to respond to tight delivery schedules.

Whenever the company had a scheduled or forced outage - which occurred perhaps three or four times per year - the valve would have to be repaired. Then, as the unit started up again, the valve would be re-damaged by the ensuing cavitation. Maintenance costs were excessive and flow control compromised.

As the station approached a scheduled outage late last summer, Control Components Inc. (CCI) was contacted about refurbishing the damaged Bailey valve. (The Bailey line of valves was transferred to CCI from Bailey Controls Company in 1981, and CCI serves as the authorized OEM for all existing installations.)

The company’s response went beyond simply patching up an ongoing problem. Their proposed solution was to install a 4" DRAG feedwater bypass valve in parallel with the larger Bailey valve. By utilizing DRAG trim technology this 4" valve would then be able to handle the severe pressure drop prior to the opening of the feedwater regulating Bailey valve. This would provide a long-term solution by eliminating cavitation from the system and solving the plant’s valve maintenance problem.

This approach looked satisfactory to plant management, but there was one major problem - the station’s scheduled outage was less than a month and a half away. Despite the fact that a custom-designed severe service valve of this type has a typical lead time of 20 weeks, CCI accepted the order and committed to a 6-week delivery schedule.

Less than 30 days after the order was placed, the new valve was packed and on its way. It arrived at the power station in a little over 4'/2 weeks - nine days ahead of schedule.

According to the plant supervisor, the CCI DRAG valve is now doing an excellent job of eliminating cavitation and protecting their primary feedwater regulating valve. Equally important, however, is the fact that the valve was delivered significantly ahead of schedule and the power plant avoided a serious outage problem.

Actually this story began 12 months before CCI solved the problems at this facility. In August, 1991, Stuart Carson, Control Component’s president issued a very simple directive to his entire staff. “We will not lose an order for a custom valve because of a customer’s need for a quick delivery!”

Issuing the order was easy, its implementation was not. At the time, CCI deliveries were typical of the severe service valve industry as a whole. Custom-engineered valves usually took 20 to 26 weeks to produce, from receipt of the customer’s purchase order to shipment.

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The first step in speeding up the production process was to change the scheduling system. Instead of forward scheduling (first in, first out) the company went to a backward scheduling system. This meant that every job was worked backward to determine critical deadlines. The person in charge of each step in the design, manufacturing and quality control process was required to answer a simple question: If the entire job is to be finished on time, when must my part of the job be completed?

This gave everyone involved in the process a clear idea of critical milestones and due dates. Priorities were established and weekly work schedules published. Every job being worked on was identified and appropriate resources allocated. If more capacity was needed, a shift was expanded or added. If a job was falling behind schedule, it was caught early on and adjustments were made.

To make this backward scheduling work, other changes were also necessary. First off, "cheat sheets" were eliminated on the shop floor, and the printed schedule was strictly adhered to. Everyone understood the same set of production priorities, and no one ended up making promises to customers that couldn't be kept because of unannounced changes.

QUICK TURN-AROUND SUCCESS STORIES

Many CCI customer hae benefited from the company's quick turn-around commitment. The folowing are a sample of the more dramatic succes stories:

CUSTOMER:	Commonwealth Edison, Dresden
BUSINESS:	Nuclear Power Plant
LOCATION:	Morris, Illinois
PRODUCT:	Design and Manufacture of New DRAG Disk Stack
COMPLETION TIME:	1 Week
CUSTOMER:	Exxon, USA
BUSINESS:	Oil Treating Facility
LOCATION:	Jay, Florida
PRODUCT:	(1) 4" Seawater Recirculation Valve
COMPLETION TIME:	2 Weeks
CUSTOMER:	PA Power & Light, Susquehanna
BUSINESS:	Nucear Power Plant
LOCATION:	Berwick, PA
PRODUCT:	(5) 3" Diesel Generator Intercooler Control Valves
COMPLETION TIME:	11 Weeks
CUSTOMER:	Parsons Main, Lockport Cogeneration
BUSINESS:	Fossil Fuel Power Plant
LOCATION:	Jay, Florida
PRODUCT:	Resistor Upgrade and Installation
COMPLETION TIME:	2 Weeks
PRODUCT:	Cage
COMPLETION TIME:	1 Day
PRODUCT:	Cage

"Our goal in all of this is not simply to be the fastest manufacturer of valves. Rather it is to better serve the needs of our customers"

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Stuart Carson

Second, the quality of the workforce was upgraded by providing cross-training to both machine tool operators and engineers. Production bottlenecks could then be resolved by moving personnel around and adding additional shifts. Operators learned how to work on a variety of different machines, and engineers learned how to design, draft and specify the manufacturing process.

This all led to a third change - the company's second shift was beefed up while a third shift of 4 to 5 people was added. Today, CCI runs two full shifts and a medium-sized third shift, seven days per week.

Valve bodies are cut to precision tolerances by a computer-controlled vertical turret lathe.

Fourth, the company made a major commitment to upgrading its capital equipment. CNC machine tools were purchased and plans have been made for the implementation of cellular manufacturing techniques. This will allow CCI to dramatically increase both productivity and machining accuracy.

The last change undertaken was perhaps the most important. According to Gordon Kent, CCI's Manager of Manufacturing, the company wanted to draw its workforce closer to its customers. "We started by bringing our customers out onto the shop floor. Suddenly our machine operators were able to see the people and get a feel for the project behind every valve. This has made a tremendous difference in the level of commitment and sense of urgency that our people feel for the needs of our customers."

Manufacturing accuracy is maintained to within +/- 0.001" of the dimensions specified.

The results of all this innovation? CCI now boasts the shortest lead times of any custom engineered, severe service valve manufacturer in the world. Average turn-around times have shrunk from 20 to 26 weeks (depending on size and complexity) to only 10 to 16 weeks - in most instances a 40% reduction in lead times.

And in emergencies, CCI has been able to design, build and deliver valves in as little as seven days!

"Our goal in all of this is not simply to be the fastest manufacturer of valves," states CCI's president, Stuart Carson. "Rather, it is to better serve the needs of our customers. Some projects have long lead times, and a 20-week turn-around is perfectly acceptable; but when the customer has a more urgent need, we have to be able to respond in a timely fashion.

"That really gets to the heart of the matter. The quality of our product is related not only to its performance, but also to its timeliness. A great product delivered two weeks later than the customer needs it, fails the quality test.

"Our business is to analyze flow control problems and then provide solutions that come packaged in a valve," concludes Carson. "Problems have a time-dimension, and so do solutions. That's really why we made the commitment to not lose any order because of a lead time issue. It's part of our Total Quality orientation. In this business, the customer must come first."

In order to eliminate bottlenecks and speed production, operators are cross-trained on many different machine tools.

Control Components Solves Critical Valve Problems On North Sea Oil Platform

Due east off the coast of Aberdeen, Scotland, in the North Sea, lies one of the most significant hydrocarbon deposit finds of the last quarter century. With reserves estimated in excess of 23 billion barrels, these fields rank as the ninth largest oil deposit in the world. But as rich as the fields may be, the North Sea also has the distinction of being one of the most difficult areas in the world to explore and exploit.

It is also one of the most dangerous. Storms rage through this part of the North Sea on an average of 273 days per year. Waves up to 90-feet high toss tankers and service craft around like children's toys, while 110-knot winds wrack platforms for days on end.

This brutally harsh environment tests the will and strength of both the personnel who work and live out on these slender metal islands and the equipment they rely on for their sustenance and survival. Consequently, performance and reliability are two of the foremost qualities demanded of platform equipment in this area.

On one of these North Sea platforms the equipment was not performing up to expectation. Shortly after commissioning, the platform began to experience problems with three of its compressor recycle flow control valves. From the beginning, the valves were generating much more noise than they should have been. The senior engineer on the project was afraid that this might be an indication of poor velocity control through the valves. If that were the case, then the operators were going to have an erosion problem on their hands in short order.

Within three months the engineer's fears were realized. The three valves in question were leaking gas in the closed position. In addition, they were slower responding in modulation mode than called for in the original specifications, and they exhibited an unacceptable level of instability in positioning, especially between the 0-10% open position.

It was essential to the platform's owner that the three valves be repaired. "The anti-surge valves provided the primary protection for their compressors against damage," said Alan Wright, CCI's sales engineer who worked to solve the platform's valve problems. "If anything were to have happened to the compressors because of a valve failure, then the platform would have been out of business."

The three valves in question were all globe valves ranging in size from 6" to 12", with valve trim sizes of 2 1/2", 4" and 6". Body ratings were API 10,000 lbs. for the 6" valve, ANSI 1500 for the 8" valve and ANSI 600 for the 12" valve. All were Class V rated for seat leakage, and none were to exceed 90 dBA at 3 feet (1 in). Pressure drops across the valves were 200 bar to 10 bar (3000 psi to 150 psi).

The original valve supplier proved unable to correct the valves' problems, and that's when the owners turned to CCI. It was quickly decided that the best approach would be to take the platform's spare valves, machine the interiors for retrofit, and install new DRAG trim. This would save the cost of casting new valve bodies and would also meet critical maintenance deadlines.

DRAG valve technology was selected for use in this severe service application for several reasons. First, the multi-stage, stacked disk design would better control gas velocities through the valve as pressures were reduced over twenty-fold. With better velocity control would come a reduction in noise and the elimination of erosion on the seating face. This would then yield greater control over gas

NORTH SEA RETROFITTED

8", 1500 ANSI Compressor recycle valve retrofitted with DRAG trim

12", 600 ANSI Compressor recycle valve retrofitted with DRAG trim

flow. Second, platform engineers were shown early-on that the trim and valve design would give them a quicker response in modulation mode and would also give them better positioning stability because of the valves' overall greater integrity. Third, CCI's quick turn-around capabilities would allow them to meet the tight deadlines they found themselves up against.

From start to finish the entire job - including an additional 6" flare-to-discharge valve - took 11 weeks. The platform engineers were able to install the valves during a scheduled maintenance outage, and the plat-form was up and running again as planned.

According to CCI's Wright, the valves are performing well. "Noise levels are at or below spec, and the leakage problems have all but disappeared. Response rates are excel-lent and flow control is greatly improved. Not only did they get obviously superior valves, they also got them within an exceptionally short timeframe. This is the kind of quality and service we promise to all of our customers. After all, it's our job to make our customers' lives easier," concluded Wright. "It's tough enough out there without equipment failure making things worse."

Control Components Now Supporting Gate, Globe, And Check Valve Users

In order to better serve the needs of their customers in the power generation, oil processing, and petrochemical industries, CCI now provides a full range of services to gate, globe and check valve users.

According to Vinay Nagpal, CCI's VP of Marketing and Sales, the company entered this part of the valve market as a result of customer requests for assistance. "Our customers told us about their difficulties in getting field service for installed equipment, trouble getting parts quickly, and instances of poor valve performance in certain applications," he said. "We knew we could provide a higher level of service than they were getting, and we're committed to doing just that."

CCl's scope of supply encompasses design and manufacture of a range of valves, formerly produced under the Dikkers name, including:

Pressure Seal Gate (ANSI 600-2500 / DIN PN 100-400, sizes 2 1/2"-24")
Flexible Wedge Gate (ANSI 150-300/ DIN PN 25-64, sizes 2 1/2"-30")
Breechlock Gate (ANSI 1500-2500 /DIN PN 250-400, sizes 2 1/2"-12")
Free-Flow Stop/Check Globe (ANSI 1500/DIN PN 250, sizes 6"- 14")
Bolted Bonnet Type Swing Check (ANSI 900-1500/DIN PN 160 -250, sizes 2 1/2"- 12")
Pressure Seal Tilting Check (ANSI 1500-2500/DIN PN 250-400, sizes 3"-12")

In addition, CCI offers OEM replacement parts, rebuilds, upgrades and field service to support these valves, as well as N-stamp valves formerly produced by Pacific Valve Inc.

CCI is Iso 9000 certified and holds ASME Class 1, 2 and 3 N and NPT stamp approvals.

Newly manufactured gate valve body, wedge, and seat ring from CCI.