



sales

West Region

Targeted Airblow at Russel City Power Plant, USA

by Blake Gearhart, VP Operations – West

(written by Sara Schmuck, Managing Editor, Ellenbecker Communications)

A new facility called Russell City Energy Center will be up to 40 percent more efficient and significantly cleaner than older technology, using reclaimed water for cooling and boiler makeup, and preventing nearly 4 million gallons of wastewater per day from being discharged into San Francisco Bay as it generates electricity.

That tall order was started on May 22, 2001, when Calpine Corporation and Bechtel Enterprises Holdings Inc., known as the Calpine/Bechtel Joint Development, filed an Application for Certification with the California Energy Commission seeking approval to construct and operate a 619 megawatt (MW) natural gas-fired, combined-cycle, electric generating facility. Calpine is the owner of the facility and Bechtel is the general contractor. Construction didn't start until 2010 and by 2013, the pressure was on to complete the job on time and on budget. **Cogen Cleaning** and Atlas Copco Rental equipment stepped in during the final stages before startup—with oil-free air to clean the pipes.

The 14.7-acre facility site, known as the Russell City Energy Center (RCEC), is located in Hayward, Alameda County, Calif. The isolated location sits in the Industrial Corridor directly south of Hayward's Water Pollution Control Facility.

The project consists of two "F-class" combustion turbine-generators (CTGs), two multi-pressure, supplementary-fired heat recovery steam generators (HRSGs), a single three-pressure, reheat, condensing steam turbine-generator (STG), and a hybrid, wet/dry plume-abated mechanical draft cooling tower. A facility of this type operates at 90 percent efficiency using natural gas to drive the F-class generators, while recycled steam from those generators powers the secondary steam system.

Preparations for startup

The process of commissioning a startup requires cleaning the pipes throughout the facility. That task was awarded to Cogen Cleaning Technology of San Leon, Texas, a global company that specializes in all types of piped facilities cleaning.

Kevin Wakeem, the project manager on the RCEC project for Cogen, said, "Steam is the preferred method for this type of work, but because of water availability and timing, the next best alternative is oil-free air."

The company chose Atlas Copco Rental to assist them

with the compressors, boosters and other components for the job. Chris Rhoades was Atlas Copco Rental's sales representative on this project. He said, "We needed 22 truckloads of equipment to supply enough equipment for this project."

Wakeem said he has completed dozens of chemical, targeted steam blow and targeted airblow projects around the world, but only about 10 big airblows like this one. And the size is significant, about 30 percent larger than the others he has managed. "Typically a big airblow will be eight to 12 compressors. This project had a total of 18 Atlas Copco PNS 1250 and XRVS high pressure compressors." Wakeem said 16 were required at a time, with the additional two compressors serving as backup. "We scale a project with one booster for every two compressors for the high pressure portion of this project," Wakeem said. They rented nine Atlas Copco B7-41/1000 Hurricane boosters.

The air must be perfectly clean flowing into the plant, and because the boosters run on oil-flooded screws, every booster had a coalescing filter pack inline following the booster. These were also rented from Atlas Copco. Although the Atlas Copco compressors used less diesel fuel due to the FuelXpert™ feature, a constant and abundant fuel source was necessary. Atlas Copco rented 14, 800-gallon auxiliary fuel tanks for this project. The job was running only 7 a.m. to 7 p.m., but the compressors could have actually run a full day without having to stop for refueling.

The plan was originally to have two backup compressors, but because of their availability and tight timeline to complete the project, the plan was changed. Having the additional air volume of two XRVS high pressure compressors allowed Wakeem to reconfigure the manifold so the high pressure and low pressure testing could be conducted at the same time.

"The type of process we use is based on matching the build design specifications with the air, steam or chemical methods for cleaning. Those are specified by the OEMs for the components in the plant," Wakeem said.

Every facility requires a chemical cleaning first. This is a combination of soaps and acids to remove flux, slag and other residues left by the welding process. Wakeem said on this job the chemical process was followed by a

"hydrolaze" process. "That's a high-pressure spray that knocks out debris stuck to the walls of the pipes."

It was at this point the compressors were brought into the job. In total it took a month for this airblow project. "The idea is that the customer wanted us to do this on the fast track. Each of the two high-pressure blows will take a week, the low-pressure systems two to three days, and the intermediate pressure systems three to four days each. It's about a week per system, but we are combining the process to get it done faster," Wakeem said.

Gregg Alper, President and CEO of Cogen Cleaning said, "CCT has been doing airblows for years, unfortunately with companies professing to provide 'oil-free air.' It wasn't until our partnership with Atlas Copco Rental that we perfected the service and started to provide our clients the continuity we feel separates us from other service companies. Choosing Atlas Copco Rental as our partner in this project was a no-brainer. Our previous business with Atlas Copco and particularly Chris Rhoades created the perfect environment to win this project and serve our customer with the best equipment available. Chris and his team were critical in securing this project, providing their expertise all throughout the bid process."

Choosing a partner

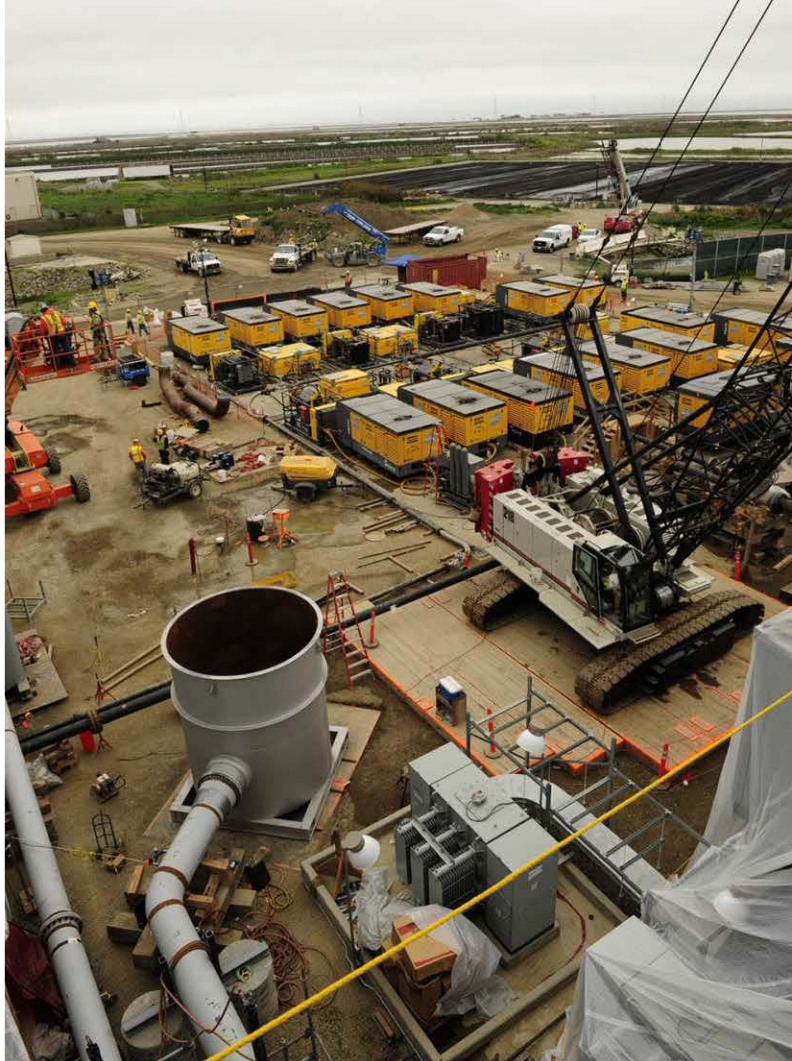
Selecting the air solution was more than a choice of manufacturers. The extra time usually associated with renting in a heavily regulated environment was reduced because of the Atlas Copco Rental partnership. "There may be no other place more regulated than California. Choosing Atlas Copco to work with is a great help. They have gone through the certification process. They take care of recording and reporting. Atlas Copco handles the regulatory problem that is California. If these machines can work in California, they can work anywhere," Wakeem said.

Finishing targeted airblows

The process of blowing air to clean the plant's piping systems consisted of a systematic, precisely timed routine. Air entered the system in a series of blows. The bank of compressors produced 20,000 cfm while the boosters increased the 350 psi compressor air to the required 900 psi. Wakeem said, "It's a process. The 900 psi air is released for about five seconds using one of Cogen's quick opening valves and the system needs about eight and a half minutes to recharge. It's the mass flow of air that pushes debris through the system." The air was released at varying pressures to create fluctuation in pressure from 900 to 675 psi.

After this routine, a target was inserted into the line. When sufficient time had passed, the target was removed and checked for quality of air in the system.

Targets are polished carbon steel plates that have been shined to a mirror finish. After a series of targets have been tested, the change is quite visible. Targets at first are pitted and abrasive, eventually giving way to almost clean targets. Wakeem said, "This turbine manufacturer allows a 0.5 mm tolerance. That's a mark equal to the tip of a mechanical



pencil – almost indistinguishable. I just keep watching for impacts. When the targets show repeatedly clean, the process is finished."

For most projects there are 50 targets supplied. Wakeem said the target process is random and he reinserts based on knowledge of the system and previous experience. The targets are expensive and he doesn't want to waste them either. "It doesn't pay to put a target right back in if I know the result won't change for a day or two," he said.

This process for the medium and low pressure piping in the plant was done much the same way.

This project required 18 systems to be blown, each with different lengths of time. For example, there were five low-pressure systems that took five days total. The first high-pressure system required six days to complete. Wakeem said that a high pressure system was complete when he got two consecutive clean targets.

Wakeem said that with 27 large compressors and boosters operating over a long period of time there are bound to be problems. "You go into a project this size knowing there will be issues. It's how you deal with those issues that makes for success. We received very good support from Atlas Copco Rental that allowed us to continue to make progress for our customer. That to me is a successful project."