

## Optimizing Datacenter Chilled Water Production

**Switch and Data Corporation (S&D)** (NASDAQ: SXDC) operates network neutral datacenters for the world's leading Internet content and online service providers at 34 sites across North America. These sites provide redundant power, cooling and security to safeguard customers' infrastructure as well as their interconnection to each other, their customers and the global Internet.

With the explosive growth in Internet traffic, has identified time to market as a key competitive issue. Consequently, the Company has added more than a quarter million square feet of data center capacity in key North American communications hub markets in the past year. But while quick deployment of the new facilities' was crucial, their size and scope had to be in scale with actual business demand. At the same time, increased server power and cooling demand coupled with ever increasing energy costs actually have made efficient cooling production a competitive issue. Lower cooling costs can mean lower lease costs, higher operating margins, or both.

These issues were key factors in S&D's decision to enter the metro New York market by acquiring and updating an existing structure in northern NJ. Using traditional metrics, the site provided sufficient raised floor area for the projected business level. However, the 200 watt per square foot density that customers would be looking for meant that precious raised floor space may have to be used for cooling production and thus affect the overall site viability.

S&D's design firm, ID Group, was thus faced with figuring out how to quickly deliver a reliable, energy efficient, scalable cooling production plant that did not take away rentable floor space. To attack that problem, they engaged two experienced industry partners to assist with design and implementation.

**Epsilon Industries** designed a pre-packaged, modular, scalable chilled water plant to both fit the *specific physical footprint* and support the long term forecasted cooling load. The "base" module was built with sufficient physical space and electrical and piping connections for up to six 1,250 ton centrifugal chiller sets (a set contains a chiller and its associated pumps, valves and cooling tower.) However, the base module was built with only two chiller sets.

As the site business grows, up to four more modules, each containing another chiller set, can be easily added to the base system. The innovative modular design approach has allowed S&D to maximize total site revenue potential while minimizing the upfront infrastructure investment requirements.

**tekWorx** designed an adaptive control system to minimize the plant energy consumption and integrated it with S&D's corporate IT network for remote monitoring of critical values and conditions via the Internet.

The adaptive control algorithms continuously evaluate equipment operation and load conditions, and adjust operation to meet the load at the lowest total plant kW per ton. These algorithms execute on an industrial PLC platform whose rugged design offers an added degree of reliability. In the unlikely event of a control hardware failure, plant operation is easily maintained since each piece of equipment has independently powered manual override switches.

Just like the plant itself, the control system utilizes modular design to support the additional planned cooling capacity. The base module contains a control program for all six chiller sets, although control is enabled for only two sets. Future modules will have an individual control pane so that when one arrives on site, startup consists of some simple wiring checks and connecting the respective control panel to the control system network. The control software recognizes the new equipment and factors it into the control sequence. After a brief sequence verification procedure, the new module is ready to make chilled water.



### PROJECT SNAPSHOT

#### OWNER / OPERATOR

- Switch and Data Corp.

#### LOCATION

- North Bergen, NJ

#### DESIGN ENGINEER

- ID Group / Boston, MA

#### PROJECT CRITERIA

- Scalable / expandable
- High reliability
- Cost effective cooling production (kW per ton)

#### SOLUTION

- Packaged, modular chilled water plant
- Adaptive control strategy
- Industrial PLC platform