**Sussex County DE Emergency Operations**

**Mission-Critical Communications**

**Project Goals:**
- Low equipment replacement cost
- Reduced water consumption
- Loop-field capacity Increase
- Longevity of HVAC system
- Energy savings and environmental comfort
- Eliminate/reduce electric resistance heating

**Background**

Opened in 2008, the $13 million Sussex County Emergency Operations Center is an 18,000 sq. ft. facility that processes 911 and other emergency calls and links police, fire and country-state agencies. Built to withstand hurricane force winds, it contains about $4 million worth of electronics equipment. Along with a closed loop geothermal system, its energy needs are served by a photovoltaic solar array located in an adjacent field. The EOC is cooling dominant, requiring air conditioning on all but the coldest days, due to heat gain from the communications equipment for handling the police, fire and 911 calls throughout the county.

Incoming temperatures from the geothermal ground loop were increasing due to thermal glide from the high heat output. In 2011, the county installed a temporary evaporative cooling tower to handle heat the ground could not absorb quickly enough.

The Bosch/FHP equipment installed during construction of the project provides for the heating and cooling needs of the building. When it came time to upgrade the geothermal loop to a permanent and expandable solution, Sussex County called in geothermal consultants and engineers to consider their options. As a mission critical building, the options were open to complete system replacement/upgrade, installation of a permanent cooling tower, or modification of various mechanical systems and upgrades.

The county decided to go with an ingenious pump to injection thermal exchange well system, to allow for expansion and remediation of thermal glide, increasing system redundancy, and keeping the FHP geothermal heat pump equipment intact.
Throughout construction, the FHP geothermal heat pumps continued to serve the building’s needs with little service and attention, standing out as one of very few systems not requiring modifications during the system upgrade.

“I’m pleased that we got to leave the heat pumps intact, these FHP units have been real workhorses,” said Steve Hudson, director of technical engineering at Sussex County. “I know that when it’s time to upgrade and add, we’re using Bosch-FHP all the way.”

The Sussex EOC building incorporates 13 various FHP models such as the EM300 4VTC (now the EC series) heat pumps, relying on FHP geothermal heat pumps to keep the emergency center cool, 24/7.

Benefits and Conclusion
Sussex County Engineering is pleased with the upgrade, inviting some of the geothermal upgrade team to a session of Sussex County Council in which they received a summary of the install and recognized the geothermal team for a job well done. Local news media were on hand and the Sussex Countian newspaper headline read, “Sussex Building Sets Industry Standard”. The article went on to relate that the project was a model for implementation throughout the country. The engineering department and county leaders are happy with the installation.

Installation Summary
Four 8” cased water wells were drilled to a depth of 400 feet; two are for redundant supply water pumping, and two are for injection water discharged from the plate and frame exchangers placed in the building’s geothermal circuit. Three way valves were placed in the geothermal circuit to allow for the following operation modes:
- 100% pump to reinjection
- 100% closed loop
- 100% backup cooling tower
- Varying combinations of the preceding modes

Normally, the building operates on the closed loop. When loop temperatures become elevated, the pump to reinjection circuits cool equipment and remediate underground and loop temperatures back to design parameters.

FHP geothermal heat pumps provide energy efficient comfort and cost less than $4 per day to operate