

# INDOOR COMFORT

## NEWS

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### “Green Building” Concepts Employed at Office Facility in Sacramento, Calif.

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DPR Construction, Inc. designed, built and occupies the first privately owned office building in Sacramento with Leadership in Energy and Environmental Design (LEED) certification, a program of the U.S. Green Building Council. Completed in October 2003 as a design/build project owned in conjunction with ABD Insurance and Financial Services, the 52,300-



*Above: The 52,300-square-foot DPR/APD building in Sacramento, Calif., uses innovative HVAC technologies for its heating and cooling needs; Below: A sign pointing out some of the facility's “Green Features” hangs in one of the facility's many offices.*

square-foot, two-story office building uses innovative HVAC technologies that include Turbocor compressors and a Dolphin Water Treatment system for the evaporative cooled condenser.

DPR's Craig Greenough, a LEED accredited professional and director of sustainable construction for DPR in Sacramento, discussed the building's sustainable features and the LEED checklist on which the project scored 37 points out of a possible 69 points to achieve LEED Silver Certification. Greenough said part of the reason for designing a LEED certified building was for the company to gain experience with the process and to put itself in the position of owner/builder so it can better serve clients in the construction of LEED buildings.

Greenough explained that DPR's company philosophy fits well with the “sustainable construction” and “green building” concepts that are exemplified by the LEED program. “We look at the overall picture and the long-term costs and benefits in our project planning, or what we call the triple bottom line, that includes the initial construction costs,

as well as being responsible in terms of environmental and social issues,” Greenough said.

Further explaining how social issues influenced the company's office building, Greenough said, “Our employees are very important to us, so we created a workspace with great daylighting, good outside views, and gave significant attention to indoor air quality, all of which enhance employee health and productivity.”

The LEED Project Checklist credits points toward certification for specific features, materials,

or practices under six major categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, Indoor Environmental Quality, and Innovation & Design Process.

LPA Sacramento was the building architect, and DPR was the general contractor. Building construction took about 10 months at a cost of \$6.2 million. Aircor Mechanical of Sacramento was the design/build plumbing and HVAC mechanical contractor for the project that fabricated and installed the ductwork, installed the HVAC equipment, and the building's Automated Logic Controls DDC control system.

The A/C equipment is a Mammoth



100-ton packaged, evaporative-cooled DX rooftop unit with two Turbocor compressors, an Evapco evaporative condenser, and a Yaskawa variable speed drive. The Mammoth unit was supplied through Norman S. Wright Mechanical Equipment Corporation's Sacramento office.

Rooftop equipment also includes a Reznor gas-fired furnace with 576 Mbh output and 10,000 CFM for heating, and two Carrier 5-ton rooftop units dedicated for cooling the building lobby. A Greenheck 3200 CFM exhaust fan provides restroom ventilation.

The Turbocor compressors are variable speed, high efficiency, low maintenance centrifugal compressors that use electromagnetic bearings and sensors to enable frictionless compressor shaft rotation without oil-lubrication. The two compressors cost about \$8,500 more than standard centrifugal compressors, but they qualified for utility rebates from the Sacramento Municipal Utility District (SMUD) to help DPR with the purchase. The compressors use ozone-friendly HFC-134a refrigerant, and operate with virtually no vibration, and low sound levels less than 70dBA.

The Dolphin Water Treatment System, manufactured by Clearwater Systems, LLC of Essex, CT, is a new technology for treating cooling tower water without chlorine or chemicals, and received a LEED point in the Innovation & Design Process category.

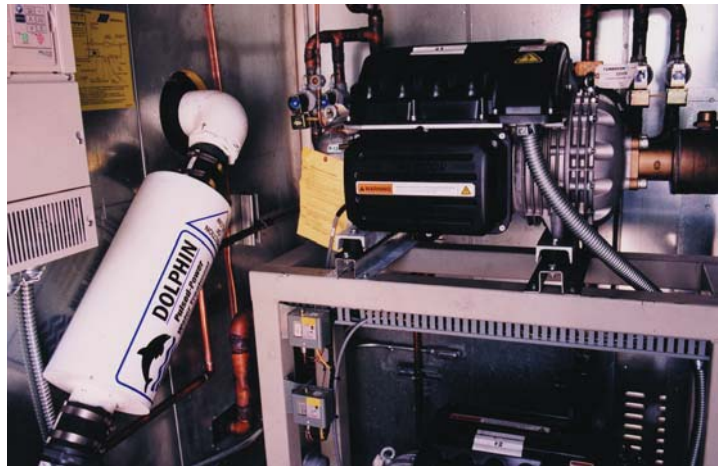
According to Randy Bryan of Precision Environmental & Power, Inc. in El Dorado Hills, Calif., the Dolphin manufacturer's rep for the project, the treatment system operates with a control panel that sends a low voltage pulse into a PVC pipe that is fit into the cooling tower's recirculating water system. The electric signal changes the way minerals in the water precipitate to prevent lime scale buildup, and it also prevents any bacteria present from reproducing, in order to achieve low total bacteria counts below other water treatment methods.

"The water quality is almost potable," Bryan said.

In addition to clean water benefits, the Dolphin eliminates chemical costs, eliminates water treatment maintenance, eliminates hazards for workers associated with chemical storage and handling, and associated regulatory issues. The Dolphin system also reduces corrosion on equipment caused by chemicals and can increase the cooling tower or condenser's operational lifespan.

On the LEED checklist under the category of Energy & Atmosphere, DPR received seven points for energy performance with credits for building beyond California's Title 24 Building Energy Standards, credits for building system commissioning and testing each piece of equipment by Airco Mechanical, a plan for recommissioning the building after one year of occupancy, low ozone depletion refrigerants and materials, and for participating in SMUD's Green Power program. DPR also received a SMUD rebate and LEED credit for a white, single-ply, cool roof installation that does not absorb heat or release heat.

The building received 11 out of 15 LEED points in Indoor Environmental Quality for carbon dioxide (CO<sub>2</sub>) monitoring sensors, use of low-emitting construction and interior materials with low or now volatile organic compounds (VOCs), based on selection of paints, carpets, wood products, adhesives and sealants, and office furniture. Points were also scored for indoor air quality management during construction and before occupancy that included



*Turbocor frictionless, oil-free compressors, and a Dolphin (non-chemical) water treatment system for the cooling water tower are part of the Mammoth 100-ton HVAC package unit at the DPR/ABD building and are two innovative technologies that helped the building gain LEED certification.*

ductwork that was cleaned and wrapped in plastic before delivery to the jobsite and kept wrapped to prevent dust and contamination until it was actually installed.

As Greenough explains, "The ductwork was pristine when installed, and we put in MERV 13 rated air filters at startup to ensure air entering the building was as clean as possible."

The building project received LEED points for practices and features in the Water Efficiency category, such as the use of waterless urinals, dual-flush toilets, low flow fixtures, and water efficient landscaping to reduce overall water use by 45 percent.

LEED points in the Materials & Resources category were given for construction waste management for diverting material from landfills and reducing overall waste content, and for use of materials with recycled content in construction and office furnishings such as carpets, ceiling tiles, insulation, rubber flooring, glass, gypsum board, and metal studs.

In the category of Innovation & Design, DPR received credit for training employees to become LEED professionals. DPR now has 53 LEED accredited professionals on staff nationwide—more than any general contractor in the nation—with 12 in the Sacramento Valley.

Credit was also given for participating in the LEED "Active Education Program." DPR provides building tours for trade associations and construction professionals, and has posted educational signs for visitors within the building, such as a sign hanging near an HVAC register that talks about the Dolphin Water Treatment system.

The Sacramento project is one of 30 projects nationwide participating in a pilot program that will help define a new LEED certification category for commercial interiors.

Greenough said based on additional initial costs of \$85,000 for features and practices to meet LEED certification (including architect and design costs), the project would achieve a payback in 2.5 years based on energy, water, and maintenance savings. By 2013, after 10 years in the building, this would result in an estimated savings of about \$360,000.