

BEST OF  
**2007**  
AWARDS

## Center for Functional Nanomaterials at Brookhaven National Laboratory

PROJECT OF THE YEAR: Research Facility

Just because the scientists are working small doesn't mean the builders aren't thinking big.

The \$38 million, 94,500-sq-ft Center for Functional Nanomaterials at Brookhaven National Laboratory in Upton, N.Y. is intended to further the study of manipulating objects at the scale of a billionth of a meter.

With an owner used to working on that level of precision, general contractor EW Howell of New York City had a high standard to meet when it finished on time in early 2006 and within budget on this fast-track project.

The center is one of five such research facilities being built across the nation by the federal Department of Energy and the largest new construction project on the Brookhaven National Laboratory campus in many years. Architect HDR Architecture provided a design that met Brookhaven National Laboratory's exacting specifications. The two-story, steel-frame, concrete-curtain-wall center features 5,000 sq ft of space for clean labs, as well as wet and dry general laboratory space, office space for users and staff, vibration- and noise-controlled research areas and anti-static flooring in lab areas.

Construction of the laboratory had to be especially precise given the requirements of working with nanomaterials. Many of



the facilities, such as the laboratories and clean rooms, required strict environmental controls, with temperature controlled to within 0.1 degrees centigrade and humidity controlled to within 5%.

Noise isolation was a critical factor for some of the center's instruments, so many labs have 24-in concrete slabs, and polypropylene filters were added to other slabs to dampen the ambient noise. Aluminum and steel shielding was installed to prevent radio and electromagnetic interference with the sensitive equipment.

Labs receive power from a drop-down utility carriage that avoids interference caused by wiring in the walls. A similar system is used for vacuum and compressed air.

Some of these requirements were added by the owner after construction had begun, and EW Howell had to work them into the

### Key Players

**Owner:** Brookhaven Science Associates LLC / U.S. Department of Energy

**Architect / Engineer:** HDR Architecture

**General Contractor:** EW Howell

schedule to meet the originally planned completion date.

A 17-month schedule that both began and finished in the cold of winter set the tone for the small margin of error in the project's planning. In order to keep track of the complex demands of each aspect of the project, EW Howell devised an overlapping schedule where each project milestone was given the same attention as the final project finish date. This allowed work on different sections to happen concurrently, while weekly project meetings with the owner and subcontractors onsite focused around a "hot list" of items that needed to be addressed immediately >>

to meet milestones.

The short timeframe also required a larger-than-average work crew, with about 125 workers per day on average and 170 per day at the busiest times.

Working within the confines of the tight schedule was a challenge, but EW Howell project manager Kevin McKenna says he was grateful for the assistance Brookhaven National Laboratory provided.

“They (lab officials) knew exactly what they wanted,” he adds. “They had their own engineers out there to help us in the field, advising us on how to resolve issues related to the construction. It was a complex job mechanically, but working with their engineers we were able to meet their requirements.”

The seasons proved to be the greatest obstacle of the project. Steel erection and concrete pours had to be scheduled in win-

ter to maintain the schedule, and the cold was a constant threat. Concrete foundation work began in late November 2005 and continued through the winter. The team had to work overtime to cover the poured concrete with blankets to keep it from freezing.

Steel erection began in January 2006, while concrete was still being poured at the other end of the building due to the overlapping scheduling. Shoveling snow became the standard way workers started and ended their days during this phase of construction.

In the cold months leading up to the project’s finish in January/February 2006, crews had to use temporary heating while working because the HVAC system was not fully operational.

That HVAC system was actually the source of a small crisis that nearly delayed

the project. The original design called for 12 custom-built air-handling units to be constructed for the project. During construction the original supplier was unable to deliver, and EW Howell had to locate a new supplier in order to install the curtain wall in the coming weeks, not to mention meet the overall completion date.

Once EW Howell located a new supplier, the custom units were to be delivered in eight weeks. <<