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McKesson Corp. in Forefront of Energy-Saving Lighting Retrofits

Installing controls and high-output, fluorescent-lamp fixtures at McKesson distribution facilities across the U.S. improved working conditions and cut energy costs.

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By Tom Moore

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McKesson Corporation is both the world's leading healthcare services company, and the leader in integrated technologies for healthcare. It delivers lower cost, higher quality products and online solutions to customers, across the full range of care providers.

By its very nature, McKesson Corporation consumes a lot of electricity operating its facilities nationwide. The company further uses a lot of commercial lamps and light fixtures.

McKesson's breadth of physical supply management and online information technologies include market-leading businesses in pharmaceutical and medical-surgical distribution, automation, information technology and outsourcing services for healthcare providers and payors. This reach of capabilities, coupled

with one of the largest customer bases in the industry, positions the company to reduce costs and improve quality for their customers.

"Customer satisfaction is our number one objective, and we continually invest in process improvements to meet that goal," states John Hammergren, chairman, president and chief executive officer of McKesson Corporation.

One of the ways McKesson Corporation continually invests in process improvements, reduces costs and improves quality for its customers, is contained in the company's Corporate Citizenship Report. In it, McKesson states their commitment to superior employee working conditions, ongoing energy-conservation efforts and the impact of those efforts on the local and regional environment where McKesson employees and facilities are situated.

The McKesson energy strategy includes energy-conservation initiatives that reduce energy consumption, lower related emission of greenhouse gases, and improves the

working environment of employees while lowering company costs.

This report does not mark the beginning of McKesson's effort. Rather, it is a summary of what has already been done and what McKesson is in the process of implementing. Such energy-conservation efforts were started well before Congress passed the Energy Policy Act of 2005 and are another sign of McKesson leadership.

For McKesson to successfully implement their energy plan across a portfolio of approximately 16,000,000 square feet of U.S. office space, data centers and distribution facilities, they asked their property-management partner, the Trammel Crow Company, to assist with finding the right companies in the energy industry who had the skills and background in identifying and implementing facility energy-conservation projects.

The McKesson-Trammel Crow team selected two companies who formed a joint venture for their mutual customer, PRES Energy and American



Occupancy sensors and controls, integrated into the fixtures, provide energy savings.



The retrofit project significantly improved work-area lighting quality.

Energy Solutions. This joint venture implemented McKesson's energy cost-reduction program.

High-Bay Distribution Center Lighting Identified as Greatest Savings Opportunity

As the PRES-American Energy team reviewed all of the site data, it became clear that the HID lighting systems in McKesson's distribution centers, nearly ten million square feet in total and located in thirty-five states, presented a great opportunity to generate immediate cost reductions along with work environment improvements. Lighting controls, which were not being used with the existing HID Systems, also presented a significant energy saving opportunity.

American Energy Corporation, one-half of the PRES-American Energy joint venture and a lighting specialist, was asked to focus their effort on designing a comprehensive solution that would allow McKesson to take advantage of the latest energy-efficient lighting methods and applications.

Linear fluorescent high-bay lighting fixtures would quickly prove themselves to be a more energy-conserving lighting method, short-term and long-term, while producing a more efficient, better quality of light inside McKesson distribution centers.

Clayton Crawford, director of Corporate Real Estate for McKesson recalls, "We were interested in the savings that fluorescent high-bay lighting technology could create but, considering the size of the investment itself, and the dramatic departure from traditional HID high-bay lighting systems, we were very cautious.

"Our direction to the design team was to demonstrate that the proposed new solution would pass the set

standards and a thorough review by our construction management and architectural team. And, by the way, there could be no reduction in light levels and no negative impact on McKesson's work environment or operations," Mr. Crawford stated.

American Energy began by touring McKesson distribution centers. The majority of facilities were big-box construction, with 30- to 35-foot high-bay lighting applications, illuminated with 400-watt metal halide or high-pressure sodium fixtures. For American Energy, its own "light" went on. An opportunity was there to reduce fixture wattage, improve quality of the illuminated environment, and lower run-time hours for fixtures through use of occupancy sensors and controls.

American Energy presented their suggestions to McKesson. A representative "beta" site was selected for conducting detailed testing and analysis. The beta study would include a complete inventory of all interior lighting fixtures, lamp types and wattages; data-logging of traffic patterns in the warehouse to confirm potential run-time reductions; capturing a baseline of existing light levels; and hosting a series of demonstration installations. The representative site was 262,000 square feet, operating virtually around the clock, six days per week.

Occupancy-Based Lighting Controls

The potential for energy savings related to occupancy sensors and controls has long been recognized in active storage and distribution facilities. However, success in capturing these savings has been elusive. HID lighting, with its often lengthy re-strike cycles, prevents systems from being turned completely off when not occupied.

This dictates use of "always on" high/low systems in connection with HID lights when controls are desired.

Marty Carew, executive vice-president of American Energy Solutions, notes, "HID systems can not be effectively cycled off and on for short durations, so you have to settle for a high/low approach. This greatly dilutes the savings potential from controlling an HID system. The result is that, as a retrofit solution, high/low HID does not typically generate an attractive return on investment."

Carew goes on to say that, "The few HID high/low systems we've encountered are typically zoned and have often been disabled by facility staff, due to dissatisfaction with their performance in the zone strategy."

Results of the data-logger study conducted by American Energy revealed that a significant 58.8% average run-time reduction could be achieved throughout the beta facility by using occupancy sensors and controls. This reduction would result in significant energy savings.

After studying the baseline facility and the proposed new lighting methodology, American Energy presented a high-bay solution to McKesson that included occupancy sensors and controls integrated into nearly every fixture. This would allow each fixture to be controlled based on occupancy levels in its immediate vicinity, eliminating zoning deficiencies inherent in HID high-low solutions.

Additional design and installation planning for full control, partial control and no control fixtures, as well as use of a proper sensor-coverage pattern for each space, kept occupant comfort issues to a minimum. McKesson management had confidence in the proposed new systems.

Product and Luminaire Selection

Once the client's objectives, facility operating patterns and technology concerns were addressed, American Energy set out to select a combination of lamp, ballast, sensor and fixture manufacturers that would best meet the needs of the project.

Along the way, the facilities, construction management and architectural team raised concerns over light levels, maintenance costs controls reliability, traffic safety, lamp sensitivity to temperature and ballast sensitivity to heat. All issues were studied and successfully addressed.

In the end, a T5 high-output fluorescent solution was selected, based on factors including:

- Providing the desired lumen package in a more compact space than possible with a T8 HBF (High-Ballast Factor) high frequency-ballast system.
- Program-start ballasts were available to use in conjunction with controls.
- Fixture durability, ballast-case temperature control, line-voltage sensor safety, and warranty package were also key considerations.

Holly Schug, senior facilities information manager for the Trammell Crow Company on the McKesson account, commented that, "While the team wanted to aggressively pursue savings, a conservative design approach allowed TCC to gain the confidence needed to recommend implementation. There are plenty of poorly designed retrofits we've heard of, that failed because the focus was on reducing energy costs without fully considering all needs of the facility. Our team was determined not to make those types of mistakes."

The design team considered many fixture styles and settled on a full fixture body design, to minimize damage from not infrequent forklift impacts. To minimize ballast compartment heat and reduce ballast-case temperature, the design team specified a deep-well ventilated fixture constructed of aluminum. Ballasts would have to carry a 90°C case

temperature rating, rather than the more standard 70°C, to guard against premature heat-related failures.

Because specified occupancy sensors were line-voltage devices, the design team opted for the safety of an extended body light fixture which fully surrounds and protects the sensor.

An Advance/Philips ballast and lamp combination was selected. Based on data-logger results, Philips was able to offer a very favorable extended lamp warranty. Advance was able to provide 90°C rated electronic ballasts. A combination of the two North American Philips companies kept the warranty under one roof.

Precision Fluorescent, an established manufacturer squarely in the lighting retrofit marketplace, was selected as the fixture supplier. This was based on their ability to support a nationwide project where each facility would require as many as a dozen high-bay SKU's, lamp/ballast configurations from 3-lamp to 6-lamp T5HO, and a variety of controls configurations, along with meeting an aggressive implementation schedule.

In addition, Precision was also able to supply all conversion kits required for existing T12 task and general office lighting.

Client Satisfaction

In the end, the most important aspect of any lighting upgrade must be having a satisfied customer. Clayton Crawford of McKesson said, "The lighting retrofit program brought two excellent features to McKesson distribution centers. We made significant, noticeable increases in light quality in areas where employees needed it to perform their work, and we achieved considerable savings in our overall energy costs.

"American Energy accomplished these without any changes to McKesson operations processes or procedures. The feedback we've received from location leaders confirms they are very pleased with the upgrades in each of their distribution centers. McKesson is

proceeding with upgrades to all their existing facilities," Mr. Crawford concludes.

Project Fast Facts

- Project Summary
 - First site completed – April, 2003.
 - Most recent finished project – March, 2006.
 - Each site base-lined using twelve months of energy bills.
 - Predicted savings have been validated at each site.
- Financial Summary To Date
 - In excess of \$3,000,000 invested.
 - Over \$335,000 in utility incentives secured.
 - More than \$1,000,000 in annual energy cost savings.
 - Cumulative savings greater than \$4,000,000 to date.
 - Average Simple Payback of 2.6 years, IRR of 37%.
- Solution Summary
 - T5 HO program-start linear fluorescent High-bay system.
 - Automated controls on 87% of fixtures.
 - More than 6,000 T5 HO high-bays installed.
 - An additional 5,000 T12 to T8 conversions performed.
 - Maintained light levels increased by 38%, after lumen depreciation at mean values is considered.
 - Color rendering, uniformity and occupant satisfaction with re-illuminated environments is greatly enhanced.
 - In facilities where forklift operators use lift-mounted and wrist-mounted data screens, operators immediately commented on reduced eye strain and greater comfort.
- Energy and Environmental Facts
 - Electric demand reduced by over 1,400 kW.
 - Annual electric consumption lowered by more than 11,000,000 kWh.
 - Emissions of carbon dioxide related to electricity generation reduced by 16,413,446 lbs annually.
 - Air pollution reduction equivalent to 2,238 acres of forest added or 1,420 cars removed from the road.

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