LED Street Lighting Test Project Report
April 13, 2009

Progress Energy Carolinas (PEC) installed nine LED test fixtures in October, 2008 on the 100 block of East Davie Street in downtown Raleigh in front of the Two Progress Plaza building and other businesses on this block. Two 200-watt and seven 250-watt high pressure sodium (HPS) street light fixtures were removed and nine 167-watt LEDway™ fixtures from BETA Lighting were installed on a one-for-one replacement basis using the existing pole locations and mounting height. Since the installation, PEC has observed the fixtures for proper operation. Light level (footcandle) readings were taken with the HPS and the LED fixtures and a point-by-point footcandle calculation has been prepared for the LED system.

Before and after photos of the lighting on Davie Street:

BEFORE (HPS)

AFTER (LED)

Technical findings:

- 51% footcandle reduction measured at selected points on the street with LED lighting
- 8% footcandle reduction measured at selected points on the sidewalks with LED lighting
- 43% footcandle reduction as calculated on the entire street with LED lighting
- 42% wattage reduction with LED lighting
- Uniformity (average to minimum) improved per calculations with LED lighting

100 Block of E. Davie Street with LED Lighting
Raleigh, NC

Lighting specifications:

- Each LED fixture is equipped with 60 LEDs and driven at 700 milliamps
- Current fixture cost: HPS fixture ~ $70 each; LED fixture ~ $485 each
- Billing for these test fixtures remained at the HPS rate for the City of Raleigh in lieu of having a filed rate tariff to recover the cost of the fixture. The N.C. Utilities Commission was made aware of this special billing treatment while the LED fixtures were under evaluation.

Progress Energy's observations to date:

- Visibility (to the eye) on Davie Street has improved.
- No operations problems have been observed to date with the LED fixtures.
- The installation of fixtures by linemen was easy with linemen commenting that the fixtures were lighter, more balanced and easy to install.
- The grounding wire added by Progress Energy linemen helped the fixture to meet National Electric Safety Code requirements. Feedback was provided directly to Beta for this improvement.
- The surge protection device (MOV Class C) added by Beta is a necessary protection device for the electronics in the fixture.

Progress Energy's conclusions:

- The Beta LEDway™ fixture is a viable fixture substitute for HPS cobra head fixtures. It is manufactured to utility grade fixture standards with tool-less entry.

- Progress Energy will test a more expensive photocontrol that has been designed for use with LED fixtures. It ignores stray LED light and is in line with the anticipated life of the LEDway™ fixture, light source, and driver. The objective is to reduce maintenance trips due to the extended light source life.

- While the LED light source anticipates less maintenance trips over its life, the industry has no long term maintenance experience with the performance of LED streetlights on an electrical distribution system. As with any fixture, maintenance will still be required for wires, brackets, knockdowns, adjustments, periodic cleaning, animal damage, pole maintenance, and potentially earlier fixture replacement (12 – 15 years) vs. today's replacement cycle of 20-25 years.

- Color improvements with a blue-white light and improved uniformity causes the overall visibility on Davie Street to improve for this application of LED fixtures on the existing pole spacings and mounting heights even though 43% less footcandles are present on the roadway.

- Improvement in visibility with LED lighting is currently under study by the lighting industry to assess whether and to what degree lower footcandle requirements are warranted. There is not industry consensus to date on this LED lighting standard. Without a revision of the existing industry standards there will likely be an adverse impact on the cost of LED lighting for DOT and other roads due to additional poles/light fixtures required to meet current adopted standards. Progress Energy and many others are working with the Illuminating Engineering Society to address this issue.

- Progress Energy should begin development of a tariff rate to offer an LED street lighting alternative to municipalities (using the approved LEDway™ product or an approved equivalent).

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