Reconditioned Transformers at Nelson Plant Boost Reliability

Entergy Gulf States Louisiana, L.L.C.'s Nelson 500kV substation at Westlake, La., now has four refurbished transmission 500/230kV auto-transformers. Reconditioning the transformers lowers the risk of mechanical or electrical failure of a transmission transformer. This lessened risk translates to increased available power to Entergy's bulk electric system.

Transmission transformers at power plant substations are enormous, complex electrical devices that must function reliably for the generation plant's output to move across Entergy's high voltage and extra-high voltage transmission lines to where it can be distributed to help keep the lights on in homes, hospitals, stores and factories.

The newly refurbished transformers allow the transmission bulk electric system to more reliably serve its role as a power source for Entergy's Louisiana and Texas customers. Additionally, internal and external repairs are expected to extend the useful service life another 20 years for the transmission auto-transformers and will result in more efficient transmission of the power produced from the Nelson generating facility. To better appreciate the need for such devices and the necessity of reliability, one must understand the link between generation and the customer.

An electron's journey

When a customer flips a light switch, turns on a computer, uses a microwave oven or watches a game on TV, the power that makes these activities possible started its journey at a power plant.

Fossil, nuclear, hydro or renewable generating plants have substations on-site or nearby. The transformers at a plant's transmission substation step up the voltage of the plant's power output to match the rated voltage of high-voltage transmission lines. These lines transmit bulk power to distribution substations where voltage is stepped down for local distribution to residential and business customers.

Project scope – (Always Safety First)

The Nelson transmission transformer project started in early April with a safety meeting. The safety meeting focused on identifying, eliminating and mitigating hazards along with training for the work ahead.

From early April through mid-May, crews drained oil from the transformers, inspected all components and tested certain items like gauges, wires and relay switches to determine if they needed to be replaced. Items that did not test fit for operation were refurbished or replaced. Exterior surfaces, including the massive radiators and the cooling fans were inspected, cleaned, serviced or replaced as needed. Lastly, each unit was thoroughly tested and received a fresh coat of specialized paint to protect against rust and corrosion before returning it to service.

Project team

Projects such as the Nelson transmission transformer project are complex, requiring a coordinated team effort from employees within Entergy and a compliment of contractors.

- John R. Scott, manager, transmission and distribution program development, watched over the project's budget.
- Michael S. Hall, specialist-operations planning at the system operations center in Pine Bluff, Ark., managed the project's impact on the Entergy system.
- Paul Pounders and Kent Girouard, area substation management, played key roles in managing resources for the project.
- Senior Transmission Engineer Adib Zainuri served as project lead.
- Andy Speegle, Bruce Brignac, David K. Becker, Daniel Thibodeaux, Mike Veillon, Mike Neal and

James Toniette provided field support.

Waukesha Services was the primary contractor.

Ready for summer

As temperatures rise with summer's approach, demand for reliable power increases. This is true especially in Louisiana where humidity and heat prompt homes and businesses to rely heavily on air conditioning. With the Nelson transmission transformers back in service, Entergy will be better positioned to provide the power to keep the AC units running.

The team on this project met the three key project metrics: no accidents, finished on time and completed within budget. The team's concentrated and concerted efforts on safety as well as project completion forms the foundation for reliable service.

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