

(I&E) Instrumentation and Electrical Crews



The inner workings of a power plant are complex, intertwined systems of machinery, computers, control systems, meters and gauges, and a host of other moving parts and pieces that must work in concert so that electricity is available to consumers at the flip of a switch. At the helm of each of South Mississippi Electric's plant systems are three instrumentation and electrical (I&E) crews.

Plant Morrow:

- 5 electricians
- 5 instrument technicians

- 1 foreman
- 1 planner
- 1 supervisor

Plant Moselle:

- 4 electricians
- 5 instrument technicians
- 1 foreman
- 1 planner

Batesville:

- 1 lead instrument and electrician technician
- 2 instrument and electrician technicians

One I&E crew located at each main generating site ensures optimal performance of all plant systems in order to maintain the availability and reliability of all units. In addition to onsite duties, the crew at the J.T. Dudley, Sr. Generation Complex (Plant Moselle) performs the same functions for the Association's four remote generating sites located at Sylvarena, Silver Creek, Benndale and Paulding.

Three areas of focus common to each site are the plant's control systems, compliance systems, and electrical systems and equipment. Each area requires technicians to have a specific skillset in order to maintain system functions and to resolve issues as quickly and efficiently as possible. Certain tasks require a thorough knowledge of system hardware, or the nuts and bolts of the components. For example, the electricians maintain each plant's medium voltage switchgear (4,160V) and 480V motor

control centers, along with the generators and other support systems located throughout each plant.

Other tasks require the technicians to navigate various computer programs. Beyond maintenance and repair, each technician must take a holistic approach to learn how each component functions as a part of the entire system.

"The biggest part of this job is to understand the control system for the turbine generators," said Plant Moselle's I&E Foreman Mark Phillips. "Rotating machinery like this needs a lot of maintenance and requires continual attention, especially on the hydraulic and lube oil systems. Next, it is important to understand how we reroute the electricity through the plant to power all of our systems."

Each turbine generator unit has two sets of controls—one that controls the turbine and one that controls the generator. The General Electric units at Plant Moselle alone operate on six separate software packages. One additional software package by Yokogawa Electric Corporation is used to control the heat-recovery steam generators (HRSGs) and other plant equipment. The R.D. Morrow, Sr. Generating Station (Plant Morrow) operates a Mesh Network Control by Invensys that allows high speed communication between the plant's control processors and computer work stations. The Batesville Generating Station uses a Siemens T3000 for the majority of its controls as well as Allen Bradley programmable logic controllers for support equipment.

These distributive control systems (DCS) are essentially central processing units the plant operators use to give the commands that 'drive' the plant. The commands are entered into a human-machine interface that relays the directives to the field instruments that ultimately generate the electricity. The operators monitor each unit's data and work hand-in-hand with the I&E technicians to address any issues.

Planners for each crew generally schedule tasks one week in advance, although the task at hand often changes minute-by-minute depending on repair needs or unit operation. The planners work with Charles Evans, operations supervisor in the control center, to coordinate planned activities with each unit's planned run schedule. Some activities require a unit to be running, such as when samples need to be pulled, while other activities such as changing out components require a lock out-tag out, which makes the unit unavailable.

Regulatory and emissions compliance are sources for the ever-growing responsibilities of the I&E groups. Continuous emissions monitoring systems (CEMS) are installed on the stack of each generating unit to track pollutants released into the atmosphere during the power generation process. The monitoring systems at each site are calibrated daily, weekly, monthly, quarterly, and annually to verify that the readings are accurate. Inaccurate readings could cause an unintentional release of pollutants, which could lead to large fines for SME. If the I&E technicians determine a unit's CEMS is not properly functioning, the unit is considered unavailable even if it is capable of producing electricity.

Requirements set forth by the North American Electric Reliability Corporation (NERC) also require regular attention from these crews in order to maintain compliance. One NERC requirement is back-up battery power for turbines and controls for all generating units. In the event a unit malfunctions, battery banks are in place to keep all emergency lube oil pumps and controls functioning until the turbine can be slowly stopped.

"Plant Morrow consists of two 200 MW units," said Larry Eaton, I&E supervisor at Plant Morrow. "These units have pumps that supply lube oil to the bearings. The power for these is supplied from our 480V motor control centers. Each unit has a Station Service Battery that consists of 58 cells that supply back-up power to the

emergency lube oil pumps and other systems for plant use. The Station Service Battery also supplies essential power for the critical support systems for each unit."

The turbines at Plant Morrow spin at a rate of 3,600 revolutions per minute, and the failure of the back-up batteries to power the emergency lube oil pumps and controls could cause catastrophic damage to the turbine. Compliance Administrator Joel Rogers assists the I&E groups at each site in reporting the quarterly inspections and periodic testing of the battery banks to NERC.

This past year and next will see several changes within the I&E groups. The Moselle Repower Project added new combustion turbines and HRSGs on Units 1 and 2, which added new instrumentation, new responsibilities and two new technicians to the Moselle group. Crews at Batesville continue to adapt to SME's standards of operation and schedules.

When SME becomes fully integrated with the Midcontinent Independent System Operator (MISO) in December, all three crews will have to adjust to the change in unit dispatch. Technicians on call are currently expected to arrive on site within one hour when problems arise, but the response time is one thing that may be adjusted to ensure that units scheduled for dispatch through MISO are available.

The work of an I&E technician involves inherent dangers as they service, test and calibrate high-voltage electrical systems, sometimes in grueling conditions. Duty may call at any hour of the day or night as power is needed 24/7. Technicians must be part engineer, part mathematician and part mechanic to diagnose and solve problems. SME's I&E technicians are highly-skilled employees who install, troubleshoot and maintain the equipment that keeps the lights on for the more than one million Mississippians SME serves.